

EDITORIAL

Railway Age

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This country is replete with organizations for the scientific study of the problems of our industrial life, and railroad technology has come in for its share of

The Man on the Firing Line Should Know

attention from such bodies. Beyond any doubt, there has been a marked improvement in practices of the maintenance of way and other departments as to both design and workmanship during the last two decades because of the application of the fundamental truths thus evolved. But much still remains to be done. While there is a great fund of information at hand, there has been a restriction in its dissemination in a form that makes it of fundamental value to the man who does the work. Such information must be presented in the language of the foremen and the supervisors if it is to supplant the many "old wives' tales" of natural phenomena which seem to persist in spite of all modern thought. This fact is disclosed too often in meetings of the subordinate officers. The full return on the money invested in the investigation of rail failures, timber preservation, stresses in track, concrete practice, etc., can be obtained only when the information is placed in a form that makes the facts of direct, everyday application to the one who is to put them into practice. This is a problem for the railway associations and the technical publications as well as the railway managements.

Conditions incident to the war centered interest on the problem of handling the unusual volume of traffic, and necessarily less attention was given to new methods and new devices. For that

Progress in Automatic Connectors

reason comparatively little notice has been taken of a significant development in automatic connectors for the air and steam lines on car equipment. Sporadic attempts have been made to introduce automatic connectors of various types in the past but after a more or less prolonged period of trial, the equipment has ultimately been taken out of service. Within the past four years, however, several new designs have been brought out and some of these are still in service after tests of many months' duration. One important system is now specifying automatic connectors on all new passenger cars and is rapidly applying the device to existing equipment. In districts where cars can be kept on the home line, this road has also used the connector in freight service. From the operating standpoint, the connector has been found to have several advantages. It lengthens the life of air hose by eliminating mechanical wear and saves time in coupling cars. Strange as it may seem, the connector has also increased the tonnage hauled in extremely cold weather. Investigations have shown that the reduction in tonnage in winter was in a large measure necessitated by the impossibility of supplying enough air for satisfactory brake operation, this being due to the leakage that occurs with the ordinary type of coupling when the hose becomes stiff from cold. The Committee on Train Brake and Signal Equipment of the Mechanical Division of the American Railway Association was delegated to investigate the subject of automatic connectors in 1919. In

its report at the last convention the appointment of a special committee on this subject was recommended but no further action has been taken. The railroads have recently standardized the car coupler to do away with the multiplicity of designs now in use. With the adoption of automatic connectors, the roads will sooner or later be forced to standardize certain features to permit the interchange of equipment. Prompt action will be needed to avoid a condition similar to that which existed at the time of the general adoption of the automatic coupler.

A few weeks ago comment was made in these columns of the epidemic of rumors concerning consolidations of railroad

The Cutting of Melons

lines. When attention was drawn by different financial papers to the fact that this matter was for the time being rather in the hands of the Interstate Commerce Commission, the rumors suddenly ceased. We now have a new fad in railway rumors—namely, in the form of reports concerning segregation of properties not used for railroad purposes and an accompanying cutting of melons for the stockholders. This new idea started from the announcement that the Lackawanna proposed to capitalize its surplus, and has appealed more and more to popular fancy since the Southern Pacific directors advised the stockholders of that road that it was planned to segregate the enormous oil properties. However, now that the idea has been suggested, it is being carried too far, and is being applied to other roads that have no such plans in mind. There is a reason for the manner in which these rumors relating to the finances of the railways are being taken up. It is that the Transportation Act has once more made railway investments worth while. The public has again begun to take notice of railway stocks and bonds. Railway men may well be pleased at these indications.

In a period of declining traffic such as we are now entering, when the freight equipment of the country becomes sufficient

Keep Up the Full Car Loading

to handle the traffic offered for transportation, there is a natural tendency for shippers and railway men alike to let down in their efforts to secure maximum car loading. The tendency at once develops to load cars in the most easy manner, which usually means considerably less than the capacity loading. This is not economical from the standpoint of either the railways or the shippers. This is self-evident when it is realized that the average weight of an empty car is from 15 to 20 tons, while the average loading of all commodities is 27 tons. As the load of the car itself must be hauled with every movement of the contents and it requires as much tractive effort from the locomotive per ton to move this weight as it does for the contents, the importance of keeping the percentage of lading to total weight as high as possible is self-evident. This question assumes a new aspect to the shipper since the passage

of the Transportation Act, which stipulates that the rates must be sufficient to earn a fixed return on the value of the properties. Any wastes such as those due to light loading of cars add to the operating cost and thereby to the rates necessary to earn the specified return. Therefore the shipper now has a new interest in promoting economies of transportation and he can contribute to this end most effectively by co-operating in the heavy loading of cars.

Unusual interest attaches to the fifteenth international conference of the Railroad Young Men's Christian Associations

Growth of the Railroad Y. M. C. A.

of North America, which will be held in Richmond, Va., on November 18-21. The work of the Railroad Y. M. C. A. has been growing steadily for many years, a number of new buildings being opened each year and some of the older buildings being enlarged and remodeled. The growth of the organization during the past few years, or since the big membership drive of 1916, has been greatly accelerated. Today there are 284 railroad associations with a membership of about 145,000. Far more important than this growth in membership, however, is the increase in the effectiveness of the work caused by the more intensive and extensive programs which were instituted in the greater number of the associations throughout the country as a result of the seven-fold drive which was inaugurated a year ago. All of the associations set aside specific weeks for considering different phases of the work and laying plans to carry it on intensively during the year. This program included religious work, boys' work, educational, health and happiness, citizenship and social, and thrift. The Richmond conference will reflect the advance which has thus been made all along the line and will doubtless develop a still larger and more ambitious program for the coming year. Keeping men fit—physically, mentally and morally—is a vital factor in the increased safety and the more efficient operation of our railroads.

No thorough study of the cost of locomotive operation under varying conditions has been made in the past fifteen years.

Operating Studies of Locomotive Performance

At the time that this problem was analyzed, it was found that in most cases there was a definite tonnage, somewhat below the maximum which the locomotive could haul, that resulted in the lowest cost per ton-mile and the greatest number of ton-miles per locomotive per month. Under other conditions the maximum tonnage did not give the maximum traffic movement per month but there was a varying range for which the cost was practically the same and this gave considerable latitude in choosing the tonnage and speed for the division. When the analysis of this subject was made, it aroused much interest but the application of the principle was never given the attention it deserved, probably because the study involved was rather laborious. The economy of heavy train loads has been proved and roads have made great efforts to obtain motive power of high capacity, yet they have overlooked the possibilities of operating the existing power at the most economical tonnage. Recently there has been a great deal of talk about reducing operating costs by loading engines to get the greatest number of ton-miles per train *hour* instead of per train *mile*. The few tests that have been run tend to prove that when the tonnage is reduced to give the maximum ton-miles per hour, the fuel costs increase more than the wages are reduced. It seems reasonable to assume that the most economical operating condition is reached when the ton-

nage is at some value between the maximum that the engine can haul and that which gives the greatest number of ton-miles per train hour. A railroad cannot lay claim to being managed in a businesslike way unless the facts regarding the cost of operation under different conditions are definitely known. Is it not remarkable that the economics of operation, the primary function of railroading, is so shrouded in mystery? Every division superintendent can tell what economies he could effect with heavier motive power and increased train load. Of course, the operating officer should never overlook the possibilities of improvement by the use of better equipment, but in view of the fact that only a few hundred freight locomotives are purchased annually while forty thousand are in regular freight service throughout the country, it seems that too much attention is given to the results that can be obtained with new equipment and altogether too little study is devoted to methods of obtaining the best results with the facilities at hand.

The announcement that a through car from Boston, Mass., to Miami, Fla., will be put on the Federal Express which

The Pennsylvania Tunnel Route

runs between Boston and Washington is the latest development in the use of the Pennsylvania Railroad's line into New York City. The through route furnished by tunnels under the North and East rivers and Manhattan, in conjunction with the Hell Gate Bridge line connecting Long Island with the mainland, is now used by four through trains each way daily. These are the Colonial and Federal expresses between Boston and Washington, a train each way between Boston and Pittsburgh and one from Boston to Philadelphia southbound and from Philadelphia to New Haven northbound. New England has thus been given an improved passenger traffic route to the south and is by way of securing a new passenger route to the west in competition with the lines through Buffalo. The development of these routes will be watched with interest. Incidentally the advocates of electrification who are very much in the public eye, have apparently missed, or at any rate have not given much attention to the argument in their favor in this development. This is a case where electrification has actually influenced a change in traffic conditions because it has permitted the opening of such through routes. There is always a question, of course, whether other than operating conditions will allow any great number of similar developments in other cities where electrification may eventually be adopted.

It is frequently the case that the means at hand are the least frequently used. When a problem is to be solved it is natu-

Attention to Details

ral to look to some remote point for assistance, ignoring help more readily available and frequently of equal or greater value. In reading the discussions of means of increasing car miles per day which appear elsewhere in this issue, one cannot help but be impressed with the unanimity with which the authors point to the simple, universally available but commonly overlooked methods of operation as affording the solution of the problem. Little is advocated of a new or novel character; instead emphasis is placed on adherence to those rules of operation which are recognized as good at any time, but which are honored all too commonly in the breach. The problem of securing the maximum car movement, like those confronted in other phases of railway transportation, is that of intensive supervision of details.

The New York Central's faith in the value of "Safety-first" must be genuine and deep-seated. The sustained energy with which the work of the safety department is kept up and the amount of money expended for its support cannot be otherwise explained.

A Whole Month of Safety Rallies

The corps of supervisors (who devote their whole time to this work) has been enlarged so that now there is one such officer on each division of the road; and conferences of men from all parts of the twelve-thousand-mile system are held every month. For thirty days, beginning with November 5, Marcus A. Dow, the general safety agent, with members of his staff and a vaudeville company, is giving evening entertainments in the largest halls of thirty cities on the Central lines; and in five of these cities—Albany, Bellefontaine, Elkhart, Detroit and Indianapolis—the "show" is given twice (on the same day) in order to accommodate the thousands of employees who have asked for tickets. The musicians entertain the audiences for a time sufficient to put every one in the right humor, and the serious part—the new motion picture, "Bulletin 70"—follows. There are two ways (aside from the purely financial advantage, already suggested) in which to view the results and the hoped-for results of a railroad's safety activities. We may congratulate ourselves on the concrete fact that hundreds of men are today alive who, under the methods of ten years ago, would have been dead, killed by accident; or we may dwell on the purely theoretical considerations, as suggested by Mr. Dow in his recent Milwaukee address (*Railway Age*, October 22, page 702): "Real safety work is a service of the heart; the railroad man who pursues these well-known ideals with determination, thoroughness and patience does something more than earn his salary; he contributes to the great scheme of things which causes the world to progress and become better." Both views are eminently practical.

Several editorials in recent issues of the *Railway Age* have stressed the importance of proper heat treating equipment and methods in railway shops

The Heat Treating Expert as a Staff Officer

for obtaining the maximum efficiency of cutting tools. The question may be asked, Why ought railway mechanical officers to be particularly interested in this subject? There are two all-important reasons. Shop production, adequate for present needs, cannot be maintained without high speed tools, so heat treated as to stand up under the heaviest cutting speeds and feeds of which machines are capable. Steel, especially high speed steel, is expensive and with improper heat treatment becomes relatively valueless. So important are the possibilities of increased shop output and decreased loss in spoiled tools that a practical heat treating expert ought to be appointed on the staff of every superintendent of motive power. A high grade man should be secured and be given authority to institute changes and be held fully responsible for results. He could then analyze failures, as well as successes, and introduce the best steel, equipment and methods of heat treating for all the shops on a system. Not alone does tool steel need the attention of an expert heat treater. The proper heat treatment of alloy steel locomotive motion work greatly increases its strength per unit weight, although there is still a question as to its effect on the fatigue strength of the metal. Steel castings for both cars and locomotives can be practically doubled in strength by the heat treatment known as normalizing. A more recent development is the heat treatment of rolled steel car wheels with a view to increasing their strength and wearing properties. Furnaces, pyrometers, water cooled oil baths, lead baths, etc., are needed for the different heat treatments,

but most of all is needed some one who *knows* which treatment will give the best result in each case. If appointed a mechanical staff officer with the powers indicated above, a practical authority on the heat treating of steel could save his road thousands of dollars annually.

The Chicago, Burlington & Quincy has followed the example of the Delaware, Lackawanna & Western in asking

Six
Per
Cent

the Interstate Commerce Commission to approve the capitalization of its surplus. Among the reasons advanced in both requests for this approval is the desire to bring the capitalization up to a parity with the book value of the property. Both carriers say that they wish to increase the amount of stock outstanding so that the dividends on this increased stock capitalization may not appear to be at an excessive rate. The Burlington and the Lackawanna are both eminently successful roads. Through their respective strategic positions and excellent operation they have earned sufficient net income to enable them to pay their dividends and also to plough back into the properties large expenditures for improvements. These expenditures have not been accompanied by increases in the bonds or stock outstanding. The result has been that the dividend rate of the Lackawanna of late has been 20 per cent and of the Burlington 8 per cent, with extra dividends from time to time. The old theory has been that the public should have no worries concerning the dividend rate of a public utility. This theory is, of course, right as far as it goes. The rates a utility may charge should be sufficient to pay a reasonable return on the investment; whether it is able to pay a certain per cent on the capitalization outstanding is another matter. It is also true in the case of a railway that the rates must be the same for all carriers operating competitively. In the case of the Burlington, a special argument comes in because all but a portion of the dividends paid go to the treasuries of the Great Northern and the Northern Pacific and not directly to the public. Nevertheless, it is a fact that the public does pay particular attention to the dividend rate. The man in the street gets the idea that a railway paying, let us say, 10 per cent is earning an excessive income. He may not know that this 10 per cent is paid on a stock capitalization which, with the bonds outstanding, may equal only one-half the actual investment in the property. The fact that these two important roads have used the argument that they desire to increase their capitalization so that their dividends will be at a rate which the man in the street terms reasonable rather disproves the old theory and is of more than passing interest.

New Books

Traveling Publicity Campaigns, by Mary S. Routzahn. 151 pages, 19 illustrations, 5½ in. x 8 in. Bound in cloth. Published by Russell Sage Foundation. New York.

Educational and demonstration trains, such as the agricultural colleges, the railroads and other organizations began running several years ago, to the great benefit of thousands of farmers and others who could not conveniently get the same instruction in any other way, have become such a well-settled feature of the educational world, and are now so numerous, that they have been made the subject of a book, as noted at the head of this article.

This work will serve as a thorough and detailed sketch of what has been done in this line; and, moreover, the author, citing the experiences of specialists in all lines, gives very full advice and instructions as to the best methods of conducting this kind of education and advertising.

Increasing the Miles Per Car Per Day

Discussion of Means of Securing Greater Service From Cars. Practical Methods for Attaining Goal

FORTY-ONE PAPERS were received in the contest on "Means for Increasing the Average Miles Per Car Per Day," which closed on September 30. These papers were referred to a committee of judges consisting of A. G. Wells, vice-president, Atchison, Topeka & Santa Fe; J. G. Rodgers, vice-president, Northwest Region Pennsylvania System, and T. H. Beacom, vice-president and general manager, Chicago, Rock Island & Pacific, who awarded first prize to the paper submitted by A. G. Smart, general superintendent, Chicago, Burlington & Quincy, Alliance, Neb., and second prize to J. Burnett, train despatcher, Atlanta Coast Line, Waycross, Ga. Other papers which received special mention from the judges were submitted by E. H. De Groot, Jr., assistant director, Bureau of Service, Interstate Commerce Commission, Washington, D. C.; F. P. Roesch, western manager, Standard Stoker Company, Chicago; and A. T. Mercier, division superintendent, Southern Pacific, Portland, Ore. These papers are published below, and others will appear in succeeding issues.

First Prize—Attention to Details Will Speed Up Movement

By A. G. Smart

General Superintendent, Chicago, Burlington & Quincy,
Alliance, Neb.

Every department and every individual in railroad service can contribute materially to increasing the average miles per car per day, and thereby increasing the number of cars available for traffic, by co-operating intelligently and unselfishly in carrying out the various instructions governing the handling of equipment, and by persistently bringing to the notice of every shipper, receiver and handler of freight, the necessity of keeping cars in active service, so that the present number of available cars will reasonably care for the traffic that must be moved. Statistics indicate that railroad freight equipment stands still 80 per cent of the time. A concerted effort on the part of all interested can undoubtedly correct this condition to an appreciable extent.

The prompt loading, unloading and repair of cars will increase the miles per car per day materially, and when our patrons realize fully that prompt unloading and loading of equipment means more available cars for their individual business, the great majority will meet us more than half way. Close personal contact is essential to obtain the best results. Be in a position to show that your line is conserving equipment by unloading company material on arrival, releasing cars without delay. Use the resources of all departments for this purpose, if the department to which the material is consigned is not equipped to fulfill the requirements. Require way freight crews to transfer small lots of L. C. L. freight from one peddler car to another when an empty can be made available with reduced empty mileage in this manner. Solicit industries handling large numbers of cars to establish Sunday loading and unloading forces so delays over Sunday can be reduced. One group of Western industries has agreed to this plan, and as a result a delay from Saturday to Monday on approximately 40 cars each week is avoided.

In furnishing cars care should be taken to use equipment that can be applied on loading orders at or in the vicinity of destination of original load. A consignee will make

every possible endeavor to unload promptly a car that is needed by his neighbor, and the neighbor will frequently furnish additional assistance for this purpose. Disposition of empties should be in the hands of billing agents on arrival of cars under load, so there will be no lost motion when cars are released. Way freight conductors, yardmasters and switch foremen should have advance advice of all special movements so they will know just what to do with every empty car they handle.

Demurrage rates should be such that no one can afford to use railroad equipment for warehouse purposes. Shippers' orders and reconsignment privileges are prolific sources of delay and should be cut to the vanishing point. In road and yard service, anything that interferes with the constant and unimpeded flow of traffic should be thoroughly analyzed and a remedy applied.

Serious delays to power occur frequently at engine terminals. An hour saved on an engine means an additional hour for effective work in making car miles. There are few places where necessary inspections cannot be made while engines are being clinkered and supplied, so that if repairs are necessary it will be known before the engine is housed and the foreman given an opportunity to arrange for the work without loss of time.

Yard delays can be largely overcome by: (1) Running solid trains with cars for certain destinations when the amount of business warrants. (2) Grouping cars in trains at originating points and maintaining these groups when picking up or setting out between terminals. (3) Running connecting trains from all intermediate terminals, so there will be only such time lost as is necessary to fill out, change engines and way cars and properly inspect the train. All roads handle their passenger trains in this manner. Why not extend the practice to freight trains more universally than at present? It will clear yard tracks for the reception of incoming trains and frequently avoid the necessity of holding trains out, which seriously delays both power and equipment.

Proper grouping of trains will make it possible to start cars to the various transfers and switching districts with the minimum delay after the arrival of road trains at terminals. Switching of industries and transfer tracks should be done on a prearranged program of sufficient frequency to insure prompt handling, and specials runs should be discouraged, as they tend to disarrange the orderly prosecution of the work. Advance notice should be given consignees of the probable arrival of loaded cars, so they may be prepared to unload them promptly on arrival, and to connecting lines of transfer trains, so they can arrange for prompt movement.

Light running repairs should be made in the train yard by a force of light repair men employed for this purpose. Many cars are set out of trains and switched to repair tracks which, with such an arrangement in effect, would run through and avoid the delay and consequent reduction of car miles that always occurs when cars are held off for repairs. Cases will occur where the condition of equipment makes transfer of the load imperative. Such work should be done by the car repair organization, furnishing them a labor force for this purpose. Frequently under this arrangement methods of repairing without transfer will be found, that would not be discovered if the transfer work was handled by a separate organization. It will also have a tendency to decrease the number of cars where cars are marked for the repair track.

and after being placed, are carded for transfer, causing additional switching and delay.

On divisions where coal mines supplying company requirements are located, numerous transfers can be avoided by taking over bad order coal loads for company accounts, unloading on chutes to release the cars. Space on repair tracks should be assigned for loads, light repair and heavy repair cars, and switching arranged so as to interfere as little as possible with the work of the car repair forces. While cars are in urgent demand, concentrating on light repairs will increase the output, but a certain force should be kept steadily employed on heavy repairs to avoid excessive accumulations of cars that cannot be moved.

Proper inspection of trains at terminals will avoid many serious delays caused by hot journals and defective equipment, and such delays invariably involve trains other than those carrying the defective equipment. Regular points should be established on each freight division where trains are required to be stopped and inspected by trainmen, so that incipient hot journals may be located and cared for before they cause trouble. Maximum speed limits should be established on long descending grades to prevent over-zealous enginemen burning trains up.

To avoid congestion on a busy railroad a clean up of the business must be made each day. Should yard checks show more cars at stations than were moved during the previous 24 hours, a danger point is on the horizon that will grow increasingly difficult to overcome if not corrected immediately.

While it is desirable to make maximum speed between terminals, the car miles per hour is the unit that must finally govern as a measure of efficient performance. An 80-car train moving over a 100-mile division in 8 hours makes 150 more car miles per hour than a 60-car train moving over the same division in 7 hours. Hence the proper loading of trains is a vital factor to consider.

Cars furnished for loading should run through to destination, and while it is unfair to the line that has modern equipment, maintained in proper condition, to be obliged to handle its business in a great many of the cars that are now in service, nothing will add to delay and congestion more certainly than arbitrary transfers to keep equipment on the owner's line. Per diem rates should carry penalties that will provide an incentive for all lines to return cars to the owners without delay.

Car mileage statistics as between divisions, if used judiciously, will have the effect of keeping all employees thoroughly interested in an effort to do as well or better than the other fellow, but unless some specific statement can be shown as to what is actually being accomplished, interest is likely to lag.

Second Prize—Intensive Supervision Will Accomplish Results

By J. Burnett

Train Dispatcher, Atlantic Coast Line, Waycross, Ga.

A first-class railroad transportation service to every one should be one of our first considerations at this time. I do not know of any more far-reaching method than to increase the miles per car per day, because when you increase the miles a freight car travels in a day you give increase the therefore, a more satisfactory freight service. The car is released earlier; therefore, you increase the available car supply. You save per diem, now costing 90 cents per day; or, in the case of system cars, you get more service from the car, therefore you save money for your company that would ordinarily be spent for per diem or purchase of additional equipment, in addition to causing the individual car to earn more revenue. You save time and money for the shipper,

consignees, the railroad and every one, which is a stimulus to the business and well being of the locality in which you reside, as practically every one is more or less affected by our transportation systems.

In the search for the most efficient means of increasing the miles per car per day, I suggest that the operating officer see that his afternoon daily telegraphic car report is absolutely accurate and that it specifies the exact kind of equipment desired for the next day's loading and the exact kind of equipment on hand at stations, loaded and empty, so that the chief dispatcher or car distribution clerk can distribute the cars accurately and efficiently as ordered on his report. In rendering this report agents and local conductors should bear in mind that it is the basis from which the chief dispatcher or car distribution clerk fills all car orders and from which the various requisitions for and reports of equipment for the district or division are rendered. Efficient car distribution is one of the essential steps to increased miles per car per day, and the chief dispatcher or car distribution clerk should give the report careful study each day and distribute the equipment efficiently.

Agents and local conductors should see that cars are placed properly and promptly; when practicable, confer with shippers or consignees and insist that cars be loaded and released promptly. If a shipper is not going to begin loading within 24 hours, move the car elsewhere, where it will be loaded promptly, and impress the shipper with the fact that he must be prepared to load when he orders the cars. Insist that it is the car movement and not the demurrage that is desired, and that co-operation will be greatly appreciated. If a consignee is not releasing cars promptly, insist that unless he does release them promptly an embargo against his inbound business will be issued. Solicit his co-operation towards the prompt movement of cars, and if he does not respond ask the superintendent to place an embargo until he can unload promptly.

Agents, local conductors and transfer foremen should insist that each car be loaded to its full capacity. Put every pound of freight into each car that the capacity permits. It saves that much more space on the next car and gives prompter movement to the freight; it saves money for the company; it creates more cars for other movements.

Trainmasters, terminal trainmasters, yardmasters, agents and local conductors should watch closely the cars on side tracks and in yards and insist that cars be loaded, released and moved promptly. Have rendered promptly and study closely your report of cars on hand at stations. The chief dispatcher or other designated officer should check the daily report of cars on hand at each station carefully, and handle by telegraph for the prompt movement of the cars. Cases where serious delays have occurred should be passed to the superintendent for proper investigation and action.

Chief dispatchers and train dispatchers should watch the movement of business from connecting districts and through terminals very closely, and keep engines and crews with proper rest in positions to move the business with the least possible delay. The results that can be accomplished by chief dispatchers and train dispatchers who will study and apply efficient operating methods along this line carefully and consistently are great indeed, and they should be encouraged by superintendents and division operating officers. The reports of loads and empties on hand to move from stations at 6 A. M., 5 P. M. and 12.01 A. M., and the reports of loads and empties in trains from connecting lines and districts, should be studied carefully, and particularly so on Saturday afternoons and Sundays, so that there may be no delay to cars that are ready to move from points ordinarily worked by local freights, and such cars should be moved by through freights if it will facilitate the movement, instead of being permitted to hang over for locals Monday.

I do not approve of the reduction of tonnage or the opera-

tion of trains light as a speed-up method, as train movement ordinarily is a small factor, since the delays to cars occur at stations and in terminals. Superintendents, trainmasters, terminal trainmasters, agents and yardmasters should watch the make up and proper and prompt movement of trains at terminals, and the handling of cars to and from and on the interchange, repair and industrial tracks and insist that there be no lost motion in the placing, releasing, loading and moving of cars. Confer frequently with agent, mechanical repair and inspection forces to the end that the movement of cars may be expedited. The movement of cars through terminals requires the utmost study and constructive thought and co-operation of the various forces. District operating officers can hardly find a matter that requires more study and co-operative team-work than the ferreting out and elimination of terminal delays.

Watch the individual car. Keep it moving. If you can't move it, tell the man who can. Confer, discuss, instruct and solicit co-operation of railroad employees, shippers, consignees and everyone for increased movement of cars which will help to solve the car shortage situation, help the shipper, help the consignee, help the railroad and the business in general through the section served by the railroad.

A Goal and a Plan to Reach It

By E. H. De Groot, Jr.

Assistant Director, Bureau of Service, Interstate Commerce Commission, Washington, D. C.

First reach the definite conclusion that the game is worth the candle and determine to play it through. Then see that every man for whom you are responsible understands what is sought, how it is to be accomplished and just what his part in the program is. Later it will be necessary to make sure that he does not weary of well doing.

It will doubtless be accepted without dispute that to increase the average miles per car per day no attention need be given to the performance of equipment in road trains. Improvement which it is practicable to make must come through a decrease in the average time that cars remain at stations and in yards and terminals. The requisite is definite knowledge concerning two points: (1) where the cars that are standing still are, and (2) how their time is spent while there. From this information must be worked out the questions of responsibility and opportunity for improvement, and with this information the rest is a matter of education, supervision and persistence; and the last is not least.

The following specific procedure is recommended: A meeting should be called by the ranking executive officer of the road or grand division, to be attended by the general managers, general superintendents of transportation, general superintendents, superintendents of transportation and division and terminal superintendents; also by the heads of the motive power, maintenance of way, traffic, purchasing and stores departments. At this meeting the executive officer should preside; the chief car service officer to be prepared with copies of a carefully developed, concisely written statement for distribution, showing what is to be done, how it can best be accomplished and why it is necessary. Statements should also be distributed showing previous accomplishments in car movement for the railroad and, to such extent as may be available, by grand divisions or districts and divisions.

Following the distribution of the statements described they should be gone over carefully and all present impressed with the fact that each department represented has a definite responsibility for the results sought and that each will be given full credit for its share in making the campaign a success.

Sufficient time should be allowed for asking and answering the questions which will occur to the various officers in the

light of their now recognized responsibility and with respect to special and local conditions. The campaign will have a tremendous advantage in that it emanates from the executive himself and so is at once removed from any status other than that of adopted policy; co-operation will be assured from the outset.

Before adjournment, and as the best judgment of all, a definite goal in miles per car per day should be fixed for the railroad as a whole, and to such extent as may be practicable for the various units of the system or road. To the extent that the latter is feasible it will be found especially helpful on account of the opportunity it affords for introducing the element of friendly competition. A definite date should also be set by which this first goal is to be reached and as the campaign proceeds progressively higher standards should be set from time to time, to be attained by successively chosen dates.

Following the general meeting provided for above the superintendents and heads of the departments designated should call early staff meetings of their own at convenient points, using the statements before described and such supplemental material as may be available. The work should be inaugurated and prosecuted simultaneously, vigorously and with the greatest publicity so far as the employees are concerned, both with regard to (1) the gains made in average miles per car per day, and (2) the decrease in average detention of cars at stations, terminals, etc., which makes the increased mileage possible. Where there is an employees' magazine, it should be used for this purpose and the spirit of friendly rivalry encouraged between the employees of different parts of the railroad.

The specific information which is necessary, i.e., (1) where the cars are left, and (2) what they are doing, must be secured by systematically checking and analyzing the records of a sufficient number of cars at each point of sufficient importance, to show to what extent their movement can be improved and then making that improvement. This is the key to the whole problem. Use it and you will be surprised at your success. Neglect it and you will fail.

The following outline covers the plan:

(1) Make careful check at each yard, terminal, interchange point and important station to determine the average time that cars remain there.

(2) Analyze the information secured at each point to locate avoidable delays in handling each different movement involved; through, interchange, industry, company freight including fuel, house, team track, switch, repair track, transfer, weighing, etc. To avoid placing the division and local people on the defensive and to fully enlist them, they should be permitted to do this work themselves but required to render comprehensive reports at frequent intervals covering both the extent of their efforts and the results obtained.

(3) Decide in conference at each point, with the approval of the superintendent, what the goal or average time limit shall be and fix the date by which it is to be obtained.

(4) Check performance against this goal and circulate up-to-date specific information concerning progress made, both with regard to average time of cars at individual stations and yards, and average miles per car per day. Make much of success.

(5) Repeat checks and analyses at intervals, utilizing the lessons gained by experience and as each station, yard, terminal, division or grand division improves, make the new mark the point from which to advance further. When it is clear beyond doubt that the practicable limit has been reached for the time being, use this as the standard by which to measure performance until changed conditions warrant a further attempt at advance.

The foregoing has reference largely, of course, to those matters over which the operating department has control; switching, placing, billing, pulling, classifying, forwarding,

giving notice of arrival, removing when released, distributing, etc. The maintenance of way, maintenance of equipment and stores departments should all be held responsible for restricting the use of revenue cars to a reasonable minimum for loading them to capacity and for releasing them promptly. This is a fertile field and it will yield well if intensively cultivated. Prompt inspection and prompt repairing are also important factors, while the purchasing department should place its orders with the necessity for freight car economy clearly in mind.

The part of the traffic department is to secure the sympathetic co-operation of the shipping public, who are vitally and directly interested in the success of the movement and can assist materially by ordering only such cars as are needed for immediate loading, loading them promptly, and to capacity, furnishing billing instructions early, billing to final destination, surrendering bills of lading without delay, unloading without taking advantage of free time, giving prompt notice of release of cars, etc.

Let the slogan be, Car Hours—Save Them!

Reduce the Switching

By F. P. Roesch*

Western Manager, The Standard Stoker Co., Chicago

The answer to this problem can be stated in three words—reduce the switching. Freight car time can be divided into two general heads, viz., (a) that in the hands of the shipper, and (b) that in the hands of the railroad company. The latter can again be subdivided into (c) time in the hands of the mechanical department and (d) time in the hands of the transportation department, and the last item again divided into (e) time moving and (f) time standing. As time (a) is not entirely under the control of the railroad company, it will be disregarded and this discussion confined to time (b), as covered in (c), (d), (e) and (f).

Before we consider any reduction in time (c) we must first determine why (c) obtains. Obviously the only reason the mechanical department would hold a car is for repairs. It is equally clear that the cause for repairs is, as a rule, due to defects developed or damage sustained while in service; therefore, in order to reduce the time cars are held by the mechanical department we should first determine how and where the cars are damaged, and then by correcting the cause, automatically remove the effect. This brings us back to the original problem; viz., switching.

It is an established fact that while the time consumed on industrial tracks, loading and unloading freight is 37 per cent of the total, the greatest delay occurs in switching yards (43 per cent) breaking up and making up trains, therefore the possible time saving is as the possible reduction in train switching. Switching time alone, however, is not the only resultant time saving due to its elimination. There is a collateral saving not always considered, viz., repair track time.

Bad order statistics prove conclusively that bad order cars are proportionate to the number of times a train is broken up. While the damage incidental to switching may not be evident immediately, yet the defective draft timbers, draw-bars, etc., produced by switching shocks are there nevertheless, and sooner or later relegate the car to the rip track. Each day or hour on the rip track is that much time lost in forward car movement; consequently, all possible rip track time saved means more car miles.

It is entirely possible to so make up through freight trains as to enable them to pass through the intermediate terminals without any change in make-up, except in locomotives and cabooses, and where power is scarce even the locomotive need

not be changed. Every switchman knows how to make up trains, otherwise he would not be a switchman. In making up local or peddler trains, the proper method is to place the cars to be set out enroute in station order, beginning usually at the head end for the first set out. The same method can be used for through trains, building up the train at the originating point, first to conform to the ruling grade on the first division over which it is to be handled, then if there is a possibility of handling increased tonnage between point of origin and the ruling grade sufficient to justify, add the excess tonnage to one end of the train, either head or hind end, depending on the nature of the set out point, *but keep all units together*, i.e., the through stuff and the set out, so that one switch will be all that is necessary. Do not scatter set outs among the other cars and do not try to handle local traffic in through freight trains, regardless of its apparent importance or "rush" and regardless of the fact that by leaving off the short load, the train may go out somewhat light in tonnage.

In car movement, it should always be kept in mind that (1) many cars are marked "rush" that are not really rush loads and (2) assuming one of these so called "rush" loads, or any other short load is put into a through train to be set out enroute, if the train consists of 50 cars and the delay incidental to setting out the car is 30 minutes, we have by this one movement made a 25-hour car delay and each additional switch or stop enroute adds to the total. Therefore, in considering car movement, it is preferable to hold the one "rush" car for the local than to delay the other 50 cars enroute. If one local train won't take care of all of the short business between two freight terminals, run two, or as many as necessary, but don't delay through trains by making locals of them.

The plan outlined above has been worked out by one railroad running out of Chicago with the result that on a single track division of 312 miles, handling an average of 2,000 cars daily, the average daily freight car mileage including "bad orders," "empties," etc., is 85 miles. On another railroad having freight divisions of 88, 100 and 117 miles between terminals, the trains are made up solid for the entire distance. The locomotives are only detached from the train to take coal and water, the engine crews being changed at the intermediate terminals, the engines running through. The trains are not broken up or in fact do not leave the main line. The result is a saving of from six to ten hours per car per train, or in other words, the trains make 188 or 217 miles in practically the same time as they formerly consumed making 88, 100 or 117 miles.

Some years ago the writer was a party to the framing up of what was afterward known as Kansas City Rule 8, which reduced to its simplest terms was—"Any loads arriving in this terminal to be accepted by the railroad serving the industry to which the load is billed, regardless of the condition of the car, the car to be set to the proper unloading track if at all possible to move it and unloaded before repairs are made." The rule not only saved the time that would otherwise have been consumed in transferring the load, but also saved the car to which the load would have been transferred. This rule has since been modified and adopted as standard at interchange points where it is assumed the car moves forward, but where the car is to be unloaded at point of acceptance Kansas City Rule 8 could still be used to advantage.

Time (c) Rip track:—Repair tracks are usually located at some distance from the main switching yard, making it necessary to make special trips to "spot" and "pull" them. There are two good reasons for this: first, because all yard room is valuable; second, bad order cars should be placed convenient to the source of material supplies and tools. However, as many cars are daily placed on rip tracks that can be and are repaired in one hour or less, and as the time between

*Mr. Roesch was formerly supervisor of fuel conservation, Northwestern region, U. S. Railroad Administration.

spotting and pulling will average four hours, not including the time consumed between yard and rip tracks, time could be conserved by having a light repair track (protected, of course), adjacent to the main switching yard. Repair parts could be carried at this point, to be replenished when needed, and the track, if connected at both ends, could be pulled as cars are repaired, this to apply only to terminals where practically all trains are switched, bearing in mind the cutting out of all intermediate switching terminals possible.

To sum up. Make up and handle freight trains the same as passenger trains. Keep them out of the yards. Change engines and cabooses on the main line. Let the locals do the local work and keep the through trains moving.

Success Lies in Improving Existing Methods

By A. F. Mercier

Division Superintendent, Southern Pacific, Portland, Ore.

In keeping cars moving, the personnel of the car despatching forces is an important consideration; therefore, employees selected for such positions must be exceptionally well versed as to the operating and physical conditions obtaining on their districts, must possess the faculty for systematizing the handling of the rather voluminous detail matters and by energetic work and clear thinking keep the situation well in hand with accurate instructions issued in advance so that equipment may be moved immediately when available.

The greatest obstacle to greater car miles is the delay in or moving through terminals. The big opportunity for improvement is through efficient yard organization and close supervision on the part of officers to insure effective co-operation between connecting line forces, advance information on car transfer and train movements and the numerous related matters.

The "Bad Order" tag is likewise an enemy with which we must reckon. The defense is apparent and I believe all lines are maintaining an efficient repair department, providing sufficient forces to effect the release of cars with minimum of delay. This feature, however, should receive close attention and situation be closely checked by supervising officers.

The remaining factor bearing on car mileage is the time cars stand idle or still. The responsibility for time may be roughly divided as follows:

Status of Car.

Awaiting placement for unloading at destination.

Those responsible for or in position to improve handling. Conductors, agents, yardmasters under supervision trainmaster.

Unloading—Loading.

Consignee or shipper. Carriers can do much by educational campaigns among their patrons, having representatives follow up their handling of cars.

Awaiting movement to reloading point:

Movement to loading point:

Placement for reloading:

Representatives of the carrier, with co-operation of consignees, get advance information as to the time cars may be released, and arrange immediate movement. Car despatcher to follow up through proper channels seeing that car is moved and placed without unnecessary delay.

Awaiting movement; loaded; Movement of load to destination:

Representatives of carrier, with co-operation of shipper, secure advance or immediate advice as to time ready, move load out on first available train, and keep the load moving with minimum of delay, until placed for unloading.

Receipt of concise, workable telegraphic reports reflecting actual check of yards, at such time of day as may best fit local conditions of distribution districts, is very necessary in order that the car despatcher may direct the distribution of available equipment intelligently. Accurate, up-to-minute work reports, covering cars ordered, furnished and actual immediate requirements of shippers, are likewise required that the car despatcher, in lining up distribution, may avoid the placement of cars at points not actually needed for immediate loading, avoiding the loss of car days through delay at loading point or cross-haul.

It is also important that a thorough and intelligent check of agent's daily report of cars on hand be made by a competent officer of the district, who will take effective action to prevent delays to equipment loading and unloading, by enlisting aid of shipper or consignee and arrange prompt application of released equipment on existing orders at that or adjacent station.

With car handling, as with any other thing of far-reaching scope, those officers and employees concerned must be thoroughly imbued with the importance and necessity of following energetically to a conclusion those details and responsibilities assigned them, in order that the existing system of distribution may not be clogged or its efficiency retarded through some shortcoming of theirs. In this the earnest and intelligent co-operation of the shipping public must be enlisted, as dilatory handling on the part of either will tend to defeat the effectiveness of the other's activity.

When all reports and clerical features are taken care of, the simple fact remains that our success depends almost wholly upon the collective efficiency of the personnel engaged in the handling of cars. Supervising officers must inject or bring about an enthusiasm and intelligent understanding co-ordination among all employees concerned, as each and every one must be on his toes and actively behind the subject with his best thought and attention.

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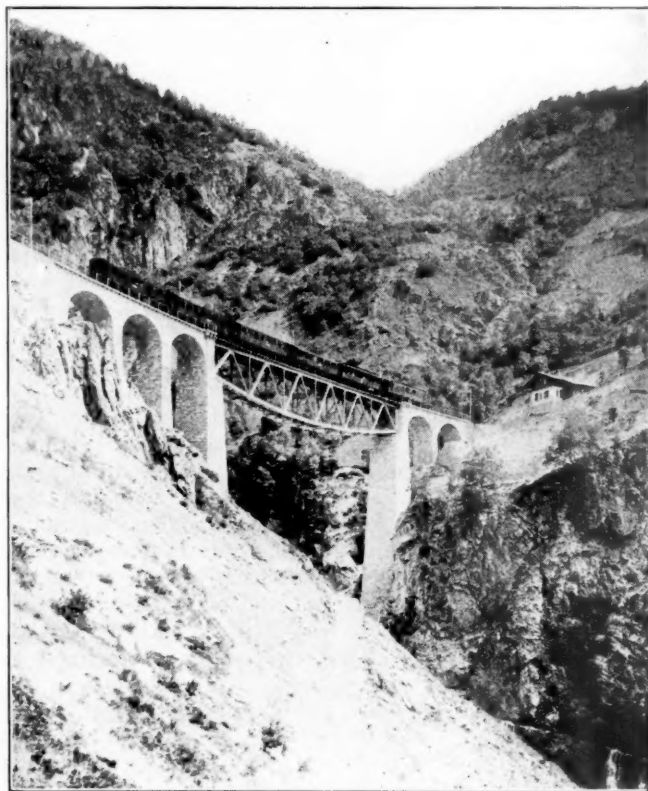


Photo from Kadel & Herbert, N. Y.

On the Lötschberg Railway of Switzerland

Railroad Completes Unique River Bank Protection*

Graded Slope Was Restored by Sedimentation and Then
Protected by Concrete Slabs

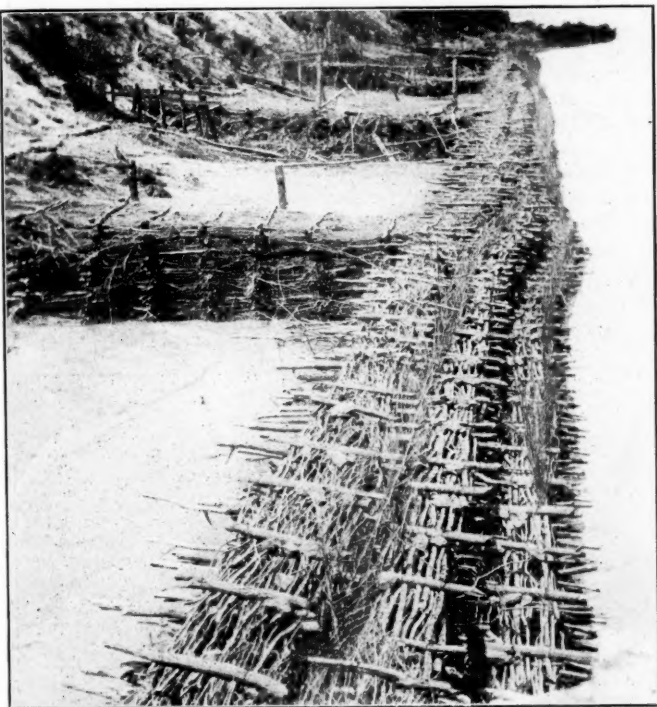
By W. C. Curd

(C. E. Smith & Co., Chicago, Ill.)

THE PROPERTY AND TRACKS of the Natchez & Southern, at Natchez, Miss., are located for $2\frac{1}{2}$ miles along the left bank of the Mississippi river on a high bank that rises precipitously to an elevation from 125 to 150 ft. above low water and being on the concave side of a sharp bend, receives the force of the current for several miles. A considerable amount of revetment has been placed along the city front by the Mississippi River Commission in past years, but it did not extend sufficiently far down stream to prevent erosion along the Natchez & Southern property. However, this latter part of the bank does not receive the full effect of the current, since the channel crosses some distance above.

In 1890, when the railroad was constructed, the intervening space between the brow of the hill and the tracks was of ade-

quate width, but protection against future loss by erosion was evidently deemed advisable, since a single row of piles, spaced from 5 to 6 ft. apart, was driven at that time along the water's edge where erosion was in progress. This work was of little benefit, and as the years went by other ineffectual forms of protection were tried with a continued loss of bank. Up to 1912, more than \$50,000 had been expended in this manner without satisfactory results.



A Close View of the Mud-Cell Construction

Following the severe flood of 1912, an examination of the location was made and so much of the bank was found to be lost that it was considered imperative to take steps for relief. Surveys for a new location back in the hills were made, but the estimated cost of a new line was in excess of \$150,000.

It was deemed advisable, therefore, to make another effort to preserve the river-front location, which could be done, it was thought, at considerably less expense than that required for a new line.

The writer, then drainage engineer for the Missouri Pacific System, and in charge of river-protection work, made an investigation of the conditions and designed an improvement, the completion of which was to extend over a period of from 5 to 6 years, at an estimated cost not to exceed \$50,000. The design was subsequently approved and all work in connection therewith completed in the early part of 1918, at a total expense of \$38,741.

The geologic formation of the Natchez hills consists of well-defined strata of clay, sand, and a deposit known locally as conglomerate or iron stone. The clay forms the surface covering, is very absorptive, and is 40 ft. or more in depth. The sand is clean and coarse, and lies between the clay and the conglomerate. The conglomerate outcrops slightly above low water in this location. The sand stratum being exposed along its vertical face was being ground away continually by the action of the elements. The clay was thus undermined and, when saturated by rainfall, would break off in large pieces and slide to the foot of the bank, carrying with it large quantities of the surrounding material. During high stages of the river, at a gage of about 35 ft., direct currents would always set in and cause a rapid loss of bank.

The previous loss of much bank made it apparent that the correction of the difficulty lay, not only in preventing further erosion, but in a restoration of the foot of the bank so that a toe might be formed and a slope worked back to the brow of the hill. Material was scarce, as the few cuts along the track would not yield enough excavation to form the toe, and the expense of having such material loaded, hauled, unloaded, and placed in the right locations along the river-front was excessive.

With the local conditions to be met, and having in mind his previous experience with various types of control works for producing scour and deposits, the writer decided to adopt mud-cell construction as affording the cheapest means for getting results. The conglomerate offered a foundation secure against scour and one on which a deposit of required width and height could be carried safely. The problem then was to gather sediment from the river, deposit it to as great a height as possible, and hold it in position against erosion, so that future slides from the top of the hill would find a permanent lodging place and a stable slope be built up by casting over the side of the hill such material as would become available from time to time.

The design required that the improvement be carried out in two parts: First, to produce sedimentation, and, second, to protect permanently the slopes after sedimentation had progressed sufficiently. The first part called for the construction of a mud-cell dike with a pile dike at its head as a protection against direct currents, and the second, the construction of a low concrete toe or retaining wall with a reinforced concrete slab paving on the slopes above.

In the fall of 1912, the mud-cell dike was constructed. It was 1,100 ft. long, 23 ft. high, and from 75 to 100 ft. from the foot of the hill. The distance from the foot of the hill

*Abstracted from a paper published by the American Society of Civil Engineers.

was regulated by the width required to give a 2 to 1 slope from low water to the top of the hill. The height of 23 ft. put the top of the dike at the 37-ft. level, Natchez gage, which was considered to be the maximum elevation to which sedimentation could be forced.

The mud cells were made from live brush and poles which were cut and towed from an island several miles up stream from the work. A 12-in. foundation mattress, 30 ft. wide, was first laid directly on the conglomerate. This was formed by laying the brush in bundles, or fascines, which were wrapped at 4-ft. intervals with single lashings of No. 9 galvanized wire. Anchor lines of $\frac{1}{2}$ -in. galvanized strand, spaced 50 ft. apart and woven into the mattress, were run back to deadmen at the foot of the hill. A tier of cells, 5 ft. by 5 ft., was built on the foundation mattress by placing single rows of brush and poles at right angles to each other, very much after the fashion of a log cabin. At a height of 5 ft. the cells were floored over with a layer of brush and a second tier of cells was started 5 ft. back from the river face of the dike. Five tiers of cells were placed in this manner, forming a completed dike 28 ft., or five cells, wide at the bottom and 5 ft., or one cell, wide at the top, and a settled height of 23 ft. All cell walls were bound with wire and cable to the foundation course, as well as to deadmen at the foot of the hill. To prevent the cells from floating when submerged, they were ballasted with loose conglomerate picked up along the river



Sediment Deposited within the Mud-Cell Construction After One High Water

front. A connection with the hill at the lower end of the dike was made by joining the latter to an old abandoned transfer barge which had been sunk in line during high water just previous to the commencement of the dike. Six lateral mud-cell dikes, or baffles, 15 ft. wide by 100 ft. long, were connected into the main dike and run up the hill to Gage 40 to prevent parallel currents and eddies in the enclosed area where sedimentation was being sought.

During the low-water period of 1913 the permanent pile dike to protect the mud-cell dike against head-water was completed. This dike extended from a point up stream to an outside lap connection with the mud-cell dike, a distance of 600 ft. The structure ranges from 8 ft. to 42 ft. in height above the natural ground surface, the top being at an elevation of 56 ft. on the Natchez gage. It is made up in width of 112 lin. ft. with piles in single rows, 216 lin. ft. in double rows, and 272 lin. ft. in three rows, with $3\frac{1}{2}$ -in. by 10-in. white oak sheeting spaced 2 in. apart, applied to the outer, or river, face of the dike. Cypress piles ranging in length from 32 ft. to 62 ft. were used and 16 ft. to 20 ft. penetrations were obtained through the conglomerate, under hard driving. The piles were spaced 8 ft. center to center, and driven in staggered position so as to gain additional strength against overturning. This necessitated an intricate system of bracing. The deflection of head-water in succeeding floods was obtained successfully with the pile dike after its completion in the spring of

1914, and sedimentation progressed very satisfactorily within the area enclosed by the mud-cell dike.

The dikes were permitted to stand through the high water of 1914 and 1915 and until the low water of 1916 without additions or changes. When an examination was made in the summer of 1916, it was found that decay had begun to show among the brush and poles forming the mud cells, and as sedimentation had progressed to an extent that the enclosed



Placing the Concrete Reinforcing on the Slab Forms

area was practically filled and a growth of willows had appeared on the surface, it seemed advisable to proceed at once with the second part of the plan, the permanent protection of the slopes.

In preparation for the permanent slope protection, all the projecting ends of the brush and poles in the mud-cell dike not covered by deposits, were chopped away. The débris was



A Completed Section of the Concrete Paving

deposited on the slopes for further use and a trench dug along the foot of the mud-cell dike for the toe wall. The bottom of the footing course was placed at about the 10-ft. level, Natchez gage, which gave a depth below the exposed surface of the conglomerate of from 3 ft. to 5 ft., this depth being ample to afford protection against under-scour in this location. The toe wall was reinforced with galvanized mesh and carried to a gage height of 14 ft., at which elevation the concrete slabs were connected to it.

The bulk of the sediment recovered by the mud cells was deposited between the dike and the foot of the hill, and did not completely fill the cells. After removing the projecting cells, it was found that some filling would be required to bring the surface of the slope to the elevation at which concrete paving was to be placed. This condition was provided for by casting the slabs in place on supported forms. The slabs were 4 in. thick, 54 in. wide, 14 ft. long, and reinforced with galvanized mesh. They were placed on a 3 to 1 slope, and cast in alternate sections.

On all supported work, the space underneath the forms was filled with debris from the mud cells. This was done to collect sediment during high water. As the first row of slabs was nearing completion, high water came and, as was expected, sufficient sediment was collected to fill solidly the space thus left. The flooring was made up in panels or sections which were removed after the concrete had hardened sufficiently to support itself. Formwork was unnecessary for the upper part of the slope, and the slabs were cast directly on the ground. The amount of paving constructed was 39,744 sq. ft., being 46 ft. wide on the slope, or up to a level of 33 ft., Natchez gage, and 864 ft. long.

A subdivision of the total cost of \$38,741 between the three classes of work performed is as follows:

Mud-cell dike	\$ 9,292
Permanent pile dike.....	10,604
Concrete paving and wall.....	18,845
Total.....	\$38,741

Cross-sections of the amount of deposits obtained through the use of the mud-cell dike were taken, but the records have been lost or cannot be located at this time. However, it is the writer's recollection that approximately 56,000 cu. yd. of material were recovered. On that basis the unit cost of restoring the foot of the bank was 16.6 cents per cu. yd., very much less than would have been required in that location by any other method. It must be borne in mind, in this connection, that had material from the hills been hauled in, some form of protection against its loss by high water would have been necessary until it had settled and the permanent paving was placed.

The general results of the work have been satisfactory and all that could have been expected. A permanent toe has been furnished on which a proper slope can be founded, and the deficiency in the width of the brow of the hill can be filled out whenever the exigencies of the situation demand it.

All work, with the exception of the permanent pile dike, was executed by the railway forces under various men, as assigned. Special credit is due J. C. Bauer, inspector of river protection, Missouri Pacific, for the execution of the mud-cell dike; it was through his efforts, while in charge of that part of the work, that the greatest obstacle was overcome. Credit is also due C. B. Colpitts, now of Coverdale & Colpitts, New York City, for the successful completion of the pile dike. The dike was contracted for, but when about 75 per cent complete, the contractors refused to proceed further, and it was completed by railway forces working under Mr. Colpitts' direction.

The writer left the employ of the Missouri Pacific System in the spring of 1917 during the interruption of the work on the concrete paving due to high water, and the final stage was carried to completion under the direction of his successor, J. A. Lahmer, principal assistant engineer, Missouri Pacific.

TELEPHONES are being substituted for the Morse telegraph for train despatching on the Colorado & Southern for a distance of 493 miles. The order for the apparatus has been placed with the Western Electric Company, the largest order of the kind received by that company since the railroads were released from federal control.

New Definitions of Subordinate Officials

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION has issued an order containing revised regulations designating the classes of employees that are to be included within the term "subordinate official" under Title III of the Transportation Act, 1920, which provides that the term "subordinate official" includes officials of carriers of such class or rank as the commission shall designate by regulation formulated and issued after such notice and hearing as the commission may prescribe. A public hearing was had on March 15 for the purpose of determining what classes of officials shall be included within the term, and the commission issued its regulations on March 23. Pursuant to petitions filed, a further public hearing was had on October 1, for the purpose of determining whether the regulations should be extended or otherwise modified.

The commission in the new order prescribes that the term "subordinate official" as used in the act shall include the following, and that these regulations shall supersede the regulations of March 23, which are set aside:

Auditors. This class shall include traveling auditors engaged in auditing station accounts, checking transportation and other papers, etc., who are not vested with discretionary power to determine the scope or character of their duties.

Claim agents. This class shall include claim agents below the rank of assistant general claim agent or chief claim agent. It does not include the so-called "claim investigators." We are of opinion that such employees who are engaged in clerical work are not "officials of carriers."

Foremen, supervisors and road masters. This class shall include road masters with rank and title not higher than division road master, track supervisors, maintenance inspectors, supervisors of bridges and buildings, with rank and title below that of superintendent of bridges and buildings, supervising carpenters with rank below that of superintendent, supervisors of water supply, supervisors and inspectors of signals with rank and title below that of assistant signal engineer, and foremen or supervisors of machinists, boiler makers, blacksmiths, sheet metal workers, electricians, car men, and their helpers and apprentices, with rank and title beneath that of general foreman.

Train despatchers. This class shall include chief, assistant chief, trick, relief and extra despatchers who are vested substantially with the authority of superintendent or assistant superintendent.

Technical engineers. This class shall include civil, mechanical, electrical and other technical engineers inferior in rank to engineers of maintenance of way, chief engineers and division engineers; engineers of maintenance of way and other technical engineers. We are of opinion that instrument men, rod men, chain men, designers, draftsmen, computers, tracers, chemists and others engaged in similar engineering or technical work are not "officials of carriers."

Yard masters. This class shall include yard masters and assistant yard masters, excepting general yard masters at large and important switching centers where of necessity such general yard masters are vested with responsibilities and authority that stamp them as officials.

Storekeepers. This class shall include storekeepers or foremen of stores who are not vested with authority to make purchases. It does not include general storekeepers and assistant general storekeepers.

"The above definitions," the commission says, "include all of the classes of employees whose claims to recognition as 'subordinate officials' were presented at the hearings, except supervisory station agents. The supervisory station agents are those who have supervision of the work of other station employees. They cover the range from the station where one employee other than the agent is employed to the agents at the largest and most important points. They are the official and responsible representatives of the company in its relationships with the public and frequently in a legal sense. Their compensation naturally varies with the responsibilities of their positions. It is not believed that this class can be consistently included within the term 'subordinate official'."

as that term is used in Title III of the Transportation Act, 1920.

"The list of subordinate officials above prescribed may be enlarged or restricted after due notice and hearing, if and when occasion warrants."

New Regulations Relating to Nominations

The commission also issued the following regulations to supersede all previous regulations governing the making and offering of nominations of members of the Labor Board:

Section 304 of the Transportation Act, 1920, provides for the creation of a Railroad Labor Board to be composed of nine members. Of these nine, three are to constitute the labor group representing the employees and subordinate officials of the carriers, and three are to constitute the management group representing the carriers, to be appointed by the President by and with the advice and consent of the Senate from not less than six nominees whose nominations shall be made and offered by such employees, and not less than six nominees whose nominations shall be made and offered by the carriers, in such manner as the commission shall by regulation prescribe.

The commission is required by regulation, formulated and issued after such notice and hearing as the commission may prescribe to the carriers and employees and subordinate officials of carriers, and organizations thereof, directly to be affected by such regulations, to determine the classes that shall be considered as coming within the term "subordinate official."

The overwhelming majority of the railroad employees and subordinate officials, stated by those who are in a position to speak with confidence and authority to be more than 90 per cent, are members of or represented through certain organizations, of employees. These organizations and their representatives have been recognized as authorized to speak for and represent the several classes of employees by the railroad companies prior to federal control, by the Railroad Administration during federal control and by the President in conference and negotiations conducted by him. It is deemed advisable to classify these representative organizations into three groups with respect to the more or less analogous character of the services performed, aiming to have the nominees, as nearly as possible, representative and conversant with the interests of all the classes of employees and employment. For the purpose of making and offering nominations as members of the labor group on the Labor Board the commission prescribes that these organizations of employees shall be grouped as follows:

Group 1:

Brotherhood of Locomotive Engineers,
Brotherhood of Locomotive Firemen and Enginemen,
Order of Railway Conductors,
Brotherhood of Railroad Trainmen,
Switchmen's Union of North America.

Group 2:

International Association of Machinists,
International Brotherhood of Boilermakers, Iron Ship
Builders and Helpers of America,
International Brotherhood of Blacksmiths, Drop Forgers
and Helpers,
Amalgamated Sheet Metal Workers, International Alliance,
Brotherhood Railway Carmen of America,
International Brotherhood of Electrical Workers.

Group 3:

Order of Railroad Telegraphers,
United Brotherhood of Maintenance of Way Employees,
and Railroad Shop Laborers,
Brotherhood of Railway Signalmen of America,
Brotherhood of Railway and Steamship Clerks, Freight
Handlers, Express and Station Employees,
International Brotherhood of Stationary Firemen and Oilers.

The accredited representatives of the organizations embraced in each of the above groups and duly authorized so to act shall agree among themselves upon nominees representative of the group, but the three groups must present a total of not less than six nominees.

The nominations agreed upon by each group shall be signed by the representatives of the several organizations in the group or by some one authorized by them so to act and shall be transmitted direct to the President accompanied by a certificate that the nominations have been made in accordance with these regulations.

The great mass of railroad employees are members of or represented through the organizations named above. These organizations, however, include or may include only a small percentage of the subordinate officials, and the subordinate officials

not so included, as well as employees who may not be members of or represented through the above organizations, are entitled under appropriate regulations prescribed by us to make and offer recommendations for members of the labor group. It should be stated, however, that a percentage of the organizations and employees who contend for their separate right of making and offering nominations for members of the labor group is included in the membership of the above-named organizations.

In view of the above considerations, we have added a fourth group for the purpose of making and offering nominations. Included in this group 4 are the following organizations, which comprise all organizations not included in groups 1, 2 and 3, which have appeared at our hearings and shown that their separate right to make nominations ought to be accorded under the Transportation Act, 1920, excepting the Supervisory Station Agents' Association, the membership of which we have held are not included in the term "subordinate official":

Group 4:

Railway Men's International Benevolent Industrial Association,
American Federation of Railroad Workers,
Order of Railroad Station Agents,
American Train Despatchers Association,
The Roadmasters & Supervisors Association of America,
National Order of Railroad Claim Men,
Railroad Yardmasters of America,
International Association of Railroad Supervisors of Mechanics,
International Association of Railroad Storekeepers,
Colored Association of Railway Employees,
Brotherhood of Railroad Station Employees,
Order of Railroad Telegraphers, Despatchers, Agents and
Signalmen,
Brotherhood of Railway Clerks,
American Association of Engineers,
Grand United Order of Locomotive Firemen of America,
Porters Union,
Skilled and Unskilled Laborers (Railway),
Order of Railway Expressmen,
Railway Traveling Auditors Association of America.

The accredited representatives of the organizations included in group 4, duly authorized so to act, shall agree among themselves upon nominees representative of each organization, or of nominees jointly representative of a number of such organizations, provided they agree among themselves upon nominees jointly representative of any of the organizations in this group.

The nominations agreed upon by each of the organizations in group 4, or agreed upon as jointly representative of any of the said organizations, shall be transmitted direct to the President, accompanied by a certificate that the nominations have been made in accordance with these regulations; and should also include statements submitted by the duly authorized representatives of each of the organizations, or of such organizations voluntarily associated for the purpose of making joint nominations, setting forth their total membership, exclusive of officials not embraced within the classes of subordinate officials as defined by the commission's regulations of November 1, 1920, or as same may be amended, distinguishing between subordinate officials and higher officials; the percentage of the membership of such organizations, exclusive of such higher officials, who are or may be members of the organizations named in groups 1, 2 and 3, and the distribution of such membership as between employees and subordinate officials.

The Association of Railway Executives is representative of approximately 95 per cent of the railroad mileage of the country and is authorized by the carriers members thereof to speak for and represent them in matters of this kind. The officers of that association have consulted with most of the carriers not members of the association and secured their assent to the presentation of nominees by the association.

For the purpose of presenting nominees for appointment on the Labor Board to represent the management group the commission prescribes that such nominations, not less than six in number, shall be made and offered by the Association of Railway Executives.

The nominations so made shall be transmitted to the President accompanied by a certificate that they have been made in accordance with these regulations.

The act provides in section 304 that any vacancy on the Labor Board shall be filled in the same manner as the original appointment. There is no specific provision for modification of the regulations prescribed by the commission, but the authority to prescribe the regulations is believed in the absence of provisions to the contrary to also confer authority to modify them if and as occasion or necessity for such modification should arise.

State Commissioners Meet in Convention at Capital

Interstate Commerce Commissioners and Others Discuss Various Phases of Rail Regulation

WASHINGTON, D. C.

THE THIRTY-SECOND ANNUAL CONVENTION of the National Association of Railway and Utilities Commissioners was begun in the rooms of the Interstate Commerce Commission at Washington on November 9; President Walter A. Shaw, of Illinois, in the chair and James B. Walker acting as secretary. Twenty-four states were represented by about 75 delegates. Edgar E. Clark, chairman of the Interstate Commerce Commission, delivered an address of welcome, President Shaw in his address made various recommendations which were referred to the executive committee with instructions to report thereon later in the session. John E. Benton, general solicitor of the association at Washington, reported the activities of his office during the last year. Abstracts of the principal addresses delivered on Monday are given below:

Railroad Regulation Under the New Law

By Edgar E. Clark

Federal control of railroads was terminated February 29 by an act of Congress which formulated a public policy widely different from that theretofore pursued. The conditions necessitated and forced substantial increases in the rates, and the carriers were encouraged to present petitions for such increases as they felt were necessary. Those petitions were given the widest circulation and through weeks of hearings all who desired to be heard with regard thereto were heard. Conclusions in this matter reached by the federal commission were assented to by the members of the state commissions who sat at the hearings; and corresponding increases in intrastate rates were with reasonable promptness accorded by the Commissions in 23 states. In only two states were the petitions for increases wholly denied and in these instances, as we are informed, the carriers made no effort to present to the state commissions evidence in support of their petitions. In several states the commissions held that they were without jurisdiction to authorize increases in rates. In each case in which increases sought have been denied by the state commission the carriers have petitioned us to institute investigation. These questions, upon which widely varying views are entertained, are troublesome and, in a sense, unpleasant. It is to be devoutly hoped that their discussion may serve to clarify doubtful or controverted points and assist us all materially in rightly doing that to which we have devoted our energies. . . . Even if we should come to government ownership and operation the necessity for a separate tribunal with jurisdiction to determine questions of reasonableness of charges and alleged discriminations will be present. It is to be noted that the government-owned railroad in Alaska and the government-owned water lines acquired during federal control are subject to the provisions of the Interstate Commerce Act. The Transportation Act, 1920, is a solemn declaration of the federal policy respecting the relation of the carriers to the public and to the government and with regard to regulation of the carriers' activities. The field of supervision and regulation has been widened and activities heretofore untouched by federal regulation have been definitely and specifically brought within that field.

The experiences of the war and of the period of federal control of railroads brought home to the whole country a realization of the vital importance of adequate transportation facilities. It has become clear, as it was always obvious

upon a little reflection, that private capital will not furnish transportation unless it can receive a reasonable return. The public must pay prices that will make the business reasonably profitable. The determination of reasonable return and fair value is a perplexing problem, embarrassed by a multitude of details.

In the transportation act Congress has in effect assured the carriers that they will be accorded opportunity to earn a reasonable return upon the value of their property and has placed upon the Interstate Commerce Commission the duty of adjusting rates so as to produce that result. This is a very definite departure from the policy formerly followed of empowering the federal commission to prescribe only the reasonable maximum rate, fare or charge.

The commission is now charged with the duty of supervising the issuance of securities by the carrier companies. Careful study of the conditions led to the practically unanimous view that in this matter the federal jurisdiction should be exclusive. Supervision by states was unsatisfactory and in a large sense impracticable.

For the first time the federal law requires the securing from the commission of certificates of public convenience and necessity before a new road can be constructed or operated and before a road in existence can be abandoned. In this connection certain powers are appropriately reserved to the states. So long as the public must pay reasonable return upon the value of the property that it uses it has the right to protection against unnecessary or unwise expenditures for duplication of lines by competing systems, and against the building of roads for purposes of pure speculation or spite. When a railroad is constructed industries and homes that are wholly dependent upon it for transportation grow up along its line. Surely the owners of those industries and homes are entitled to an assurance that that road will not be abandoned except for reasons that appeal to the honest and fair judgment of an authority that represents the public interest.

For the first time the federal commission has sweeping powers in regulating the service of the carriers. Our somewhat brief experience has furnished abundant evidence that when it comes to a question of getting or being deprived of service the business interests of the country are more interested in service than they are in the exact measure of compensation which they are to pay therefor.

Mr. Clark here discussed briefly the sections of the Transportation Act providing for consolidation of railroad systems, and said: "If the government determines what the reasonable charge shall be and requires safe, reasonable and adequate service, it is difficult to see how the public interest can be served by fostering a cut-throat competition between a large number of small and impecunious roads rather than to consolidate them into a strong, comprehensive and logical system which can at less cost furnish better service. . . ." After discussing federal control of the compensation of railroad employees and other details of the new law the speaker concluded with an appeal for co-operation of state and federal bodies. "A full measure of success can not be achieved unless we can have a cordial spirit of helpfulness and co-operation on part of the state commissions, the railroads, the shipping public and ourselves. That spirit now obtains in large part in these several quarters. If it can be made universal or unanimous it will bring much of good to all concerned and we shall rapidly approach those conditions in

transportation affairs for which we so ardently hope and so earnestly strive."

President Shaw's Annual Address

Regulation came about by reason of insistent demands by the public to correct abuses by so-called monopolies engaged in the utilities field. The public was of the mind that many of the charges exacted by the common carriers were excessive . . . Prior to our entry into the great war, regulatory bodies such as state commissions had corrected many abuses, particularly as to capital issues. In many cases rates were substantially reduced. The authorization of increased rates was the exception. . . . Now, however, the public is convinced that in order that the carriers may function properly substantial relief must be granted; therefore, they have accepted the findings of the Interstate Commerce Commission as necessary and for the best interest of all. Within the last two or three years insistent demands have been made upon state commissions to increase all classes of rates and in the majority of cases it has been necessary to meet those demands by authorizing substantial increases. In most instances, especially as to street car fares, the increases authorized exceeded those prescribed by so-called contract ordinances or franchises granted prior to the creation of the state commissions. The abrogation of many of these franchise provisions has quickly been seized upon by self-seeking politicians with the idea of furthering their own selfish ends by making the commissions unpopular. These individuals of course conveniently forget to tell the public that in the absence of commissions, utility corporations have the right to resort to the courts which would fix the rates under provisions in our federal and state constitutions that prohibit the confiscation of property without due process of law. Such procedure has been adopted by certain carriers in obtaining increased passenger rates in Illinois and other states.

That the arguments of the politicians are popular is to be seen in the fact that Mr. Esch, chairman of the committee on interstate and foreign commerce in the House of Representatives, was defeated for renomination because of the part taken by him in the passage of the so-called Esch-Cummins bill. Many other members of Congress who participated in that piece of legislation have met determined opposition in recent elections. In some of the states the abolishment of the state commission or an entire change in the personnel has been made the leading political issue, and in all candor I must say that in some instances the movement has met with much popularity.

Politics and regulation will mix no more than will oil and water. In at least one of the states the terms of all commissioners expire simultaneously with that of the governor. Hence, when a new governor comes into power it is possible for him to make a complete change in the personnel of the commission, a possibility which in the long run means defeat to regulatory efficiency. In nearly all states the compensation is in no way commensurate with the exacting duties of the position and the sacrifices required. Such conditions should be corrected as far as possible, and I recommend action by this convention. Unless regulation and politics can be divorced and some continuity of service assured, accompanied with commensurate compensation, the whole structure will fail, to the detriment of the public. The improper attitude of many utilities towards the public interferes with efficient regulation. Under government control of railroads during the war competition was suspended; and there was much complaint on the part of the public as to service rendered and as to the attitude of employees as compared with competitive conditions existing before the war. In my judgment, unless the public shall receive at least as good service and as low rates through a regulated monopoly as would

be received under the whip of competition, regulation will fail and some form of governmental ownership will necessarily prevail.

The question of finances is another important adjunct to regulation, and especially so at the present time. During the last few years we commissioners repeatedly have been told that the financing of public utility enterprises has been seriously hampered by reason of conditions brought about by the war, by the activities of politicians in obstructing franchise negotiations, and by the failure of regulatory bodies to grant needed financial relief because of political expediency or similar considerations. Perhaps the time has come for those who control the finances of this great republic of ours, to take a broad view and honestly examine themselves to see if they can satisfy their own consciences as to whether or not they have performed their full duty during this readjustment period and crisis. Having in mind their public duties and obligations to the nation, those who control the financial policies of this nation might well assume much greater responsibilities and burdens than they appear to the public to have done thus far.

As a result of the direct application of the increases authorized by the Interstate Commerce Commission and the subsequent action of the carriers and state commissions, many so-called Shreveport cases have been started and are now pending before the Interstate Commerce Commission. It must be kept in mind that state commissions must be guided by their various statutes, for example, the so-called maximum fare laws. I believe it is possible to iron out many of the conflicts by both the federal and state commissions making an honest endeavor to carry out the spirit and intent of the co-operative provisions in the Transportation Act of 1920. To the Interstate Commerce Commission may I suggest that at the earliest opportunity it promulgate general rules governing joint hearings as provided in the Transportation Act. This will be helpful because it will not require the Interstate Commerce Commission to take the initiative in all cases, as is now the case, owing to the absence of rules.

Many carriers have asked the federal commission to set aside orders entered by state commissions. Stripped of the nice phraseology used to soften the assault upon state authority, the contentions of the carriers are that the Transportation Act of 1920 takes away from the states all real control over intrastate rates; that Congress has empowered the Interstate Commerce Commission to determine all the elements by which intrastate rates are fixed and has imposed upon the state authority the purely ministerial duty of recommending legislation or promulgating orders naming the rates made necessary by the findings of the Interstate Commerce Commission.

I am of the opinion that Congress, by the Transportation Act of 1920 did not intend to abridge the authority of the states, or extend the power already possessed by the federal commission as construed by the United States courts. If the carriers shall continue their warfare against state authority I trust and urge that this association will continue to use every honorable means to protect rights each state is entitled to under the Constitution of the United States and the Constitution of the state under which the commission may be acting. This is a sworn duty from which I can see no escape. No doubt in the future, as in the past, it will be charged that your action was based upon the selfish motive of retaining your position and thus keeping yourself in power. My answer to this calumny is that the only standard one human being has by which to judge another is himself. . . . I strongly recommend that this association create a new committee composed of at least five members, known perhaps as the Committee on Litigation, to act in a capacity similar to that of the present Committee on State and Federal Legislation.

The Freight Car Situation

By Clyde B. Aitchison

Commissioner, Interstate Commerce Commission

Of all the tasks of the regulatory commission, none are more thankless than those which come in floods when the railroads of the country cannot transport traffic currently as offered. These "car shortages" have long occurred, recurred, and at times persisted over considerable periods, in varying degrees of intensity. No sin of a railroad is regarded as so heinous as the omission to perform the primary duty of a common carrier. Most of the state commissions created in 1905 and 1907 owe their origin, in part, at least, to the despair of a public, which, unable to move its commodities, and thereby confronted with most serious consequences, turned to the regulating body as a possible means of obtaining relief.

But the problem was incapable of such solution. No waving of a legislative wand by a state commission could bring cars into being as expected; nor could the fiat of government move trains over tracks or through terminals fully occupied with other cars. And, it soon developed that the relief which a state could give was either wholly inadequate because of the small compass of the territory in which it could be made operative, or else was totally void because it necessarily infringed upon federal power. It must be confessed, after long experimentation, that state legislation has not prevented the repetition of these conditions of distress; and no state commission, however zealous in the discharge of its duties, or well fortified by drastic state legislation, has been able to do more than slightly mitigate the effects of the frequently recurring situations commonly called car shortages.

And yet these convulsions of commerce have been followed by periods of comparative calm. It has also been observed that in a particular section of the country there were more cars than needed and the supply and movement of cars has been limited by some cause wholly distinct from the number or location of the cars, such as the condition of the motive power, fuel supply, lack of track and terminal facilities, or labor disturbances. The thoughtful man has ceased to think of these recurring conditions as car shortages, except as that term may be used as a convenient short expression for that which is the practical result of many different causes which may exist in varying degrees and in different combinations to bring about a partial or complete failure of transportation.

The national government has at all times been slow to enter upon the regulation of railroads, and has only done so when the way has been blazed in advance by the states. This has been particularly so as to matters of service, which, for various reasons of policy, have until recently been left practically wholly with the states. Even during federal control it was deemed advisable to leave the determination of many matters of policy to local authority. Not until the Esch car-service act of May 29, 1917, did Congress undertake to prescribe a means for the requirement of adequate service upon interstate carriers, and the operation of that act was halted almost before it started by the inception of federal control.

By the Transportation Act, 1920, unjust and unreasonable rules and practices with respect to car service are declared unlawful, and regulations or practices imposed by state authority may be brought into harmonious relation to those applicable to interstate and foreign commerce. Congress also anticipated extraordinary conditions and has clothed the commission with extraordinary powers in emergencies. It may require the joint use of terminals, give directions for preference or priority in transportation embargoes and do numerous other things. Congress provided, however, that nothing in the Act should impair the right of a state, in the exercise of its police power, to require just

and reasonable freight and passenger service for intrastate business, except in so far as such requirement is inconsistent with lawful orders of the commission.

It is obvious that there must be complete harmony of action and policy, or the promotion of good service in this matter can not be attained. We can not have 49 different policies. Indeed, with respect to matters of car service, the necessary extent of the federal power seems even more clear than as to rates. There is such a close and direct relation between the two classes of traffic, when moving over the same railroad, that adequate service for interstate traffic is best promoted by applying the requirements of the transportation act to vehicles used in moving intrastate traffic as well as to those used in moving that which is interstate. The power of Congress to regulate interstate commerce is plenary and competently may be exerted to secure adequate service for persons and property transported therein, no matter what may be the source of the impediment which tends to prevent it. If a conflict does occur, in the interest of *all* the states, there can be no doubt that one policy must prevail.

In times of car shortage the treatment must be along lines of preference, by determining which of many crying needs is first to be met with the inadequate supply at hand. The states are not well equipped with legislation to meet such a situation. There is grave danger of serious conflict between the states themselves, which has already cropped out. To illustrate: the western states require cars for the movement of accumulations of grain, and the surplus of those cars as in other states, where nothing but federal authority can compel them to be moved to the grain fields. Simultaneously, the eastern states must have returned to them the surplus of open top cars located in the western states. If a coal producing state, through a fuel administrator, attempts to retain to itself an undue amount of coal cars, manifestly it may prevent free intercourse and commerce between the states, the achievement of which was a primary reason for superseding the Articles of Confederation by the Constitution. It is intolerable that a state, through the control of the instrumentalities of commerce, should proclaim non-intercourse with other states; and a state which attempted such course would inevitably itself be the subject of similar action on the part of other states. . . . The delegation of control over interstate commerce can not be waved aside. The responsibility has been lodged with Congress, and Congress has met that responsibility by suitable legislation.

There is every reason, practical and legal, why the federal and state authorities should face the service problem squarely, and each act in the public interest within its appropriate sphere of activity, to obtain that harmony and concord of action. The task is too great to be performed from Washington. All regulating authorities have their part; and that part calls for full and cheerful co-operation between them. But without the fullest measure of co-operation with the regulating bodies on the part of the carriers, their officers and employees, and the shipping public, regulation will be futile in dealing with emergency transportation situations. This must require at times a subordination of local views and local interests. In times of shortage, all can not be served. But in times of famine it is infinitely better that an equitable system of rationing should be observed, than that we should revert to the power of the strongest to determine who should be fed and who should starve. In the transportation crisis from which we are emerging it has been shown beyond cavil that by means of hearty co-operation between the state and federal authorities, the carriers and the shippers, coupled with philosophical forbearance, we can pull through the gravest sort of emergencies.

The speaker here reviewed the freight car situation since last March, declaring that "the situation was met, squarely and courageously, in a business-like way, without political interferences or pressure of any character whatsoever, under

the orderly processes of law. By the unceasing efforts of railroad operators and employees, with the assistance of the shippers, and under the policy laid down by the commission and enforced and carried out in details by the carriers individually and through their Car Service Division, the back of the car shortage was broken, and we are now facing the possibility of a surplus of equipment." Mr. Aitchison here cited the records of improvement in car movement as reported by Class I railroads, and continued:

"But the situation is still acute in places. What has been done was first aid, and not a cure. The cure can come only with the present equipment being placed in the best possible condition; with suitable additions to rolling stock and motive power; with considerable improvements of terminals; with the additions of passing tracks and the construction of additional main tracks. These additions to the physical plant will be wholly insufficient without a continuance of such degree of centralized control as will insure a unified national policy and a high degree of co-operation as between the carriers. But even an improved plant, operated substantially as a unit, can not do the requisite amount of business unless it receives the full benefit of localized aid in avoiding every cause tending to stop the fluid movement of commerce. No organizations can so well aid in removing these obstacles as the state commissions, standing, as they do, indifferently between shippers and carriers, the representatives of the power and justness of law, and possessing an intimate and first hand knowledge of situations within the boundaries of their jurisdictions.

The present financial situation, coupled with the apparent downward trend of construction costs, makes it seem prudent not to engage upon any undue or avoidable construction program until conditions become more normal, and seemingly there can be no letting down in the intensive use of equipment. The part which has been played locally by the limited number of terminal committees which could be organized in the short time and out of the material at hand, is well known. Upon these committees, headed by a representative of the Interstate Commerce Commission, the carriers, the shipping public and the state commissions have found opportunity for co-operative service. In the interest of good administration, it is contemplated that this plan of bringing the activities of federal and state governments, of the shippers themselves, and of the operators of the railroads, into local organizations with an agency of the Interstate Commerce Commission, shall be broadened and continued. In such committees the representatives of the state commissions can be of the utmost service, without in any way detracting from their authority as regulating bodies. The transportation act marks the beginning of a new era in transportation, and the recognition therein of the necessity for the utilization by the federal authorities of the advice, assistance and co-operation of the state regulating bodies is a striking feature of that law, and one which marks a distinct step in advance.

Public Ownership and Operation

The committee on "Public Ownership and Operation," submitted a report on the general subject which in part read as follows:

The question of private ownership with regulation as against public ownership without regulation should no longer be considered by intelligent investigators as an open question.

We recognize that in some special locations public ownership and operation may appear to be successful but we hold that if the real facts might be ascertained and the same test applied to the publicly owned and operated utility as is applied by regulatory bodies to the privately owned and operated utility, the general result will apply in all instances.

We need no better illustration of the result of the attempt of the public to operate utilities than the recent operation of the railroads by the United States government, operated by the director general with such autocratic power and independent irresponsibility, that the financial and other business interests of the country wondered what, if any, limitations really existed and in what forum conflicting claims of right might be adjusted. There was no limitation on the power of the director general and he operated these utilities as a unified system with full power and authority to make and change all rules and regulations to accomplish the most beneficial results. The rate of wages and the rates to be paid by the shippers and the rate of return to the owners of the property were arbitrarily fixed by the officers of the national government.

The result is common knowledge. The manner and method of turning the roads back became such a complicated question that the situation became similar to that of the man who had hold of the bear—he was unable to hold on and feared to let go. The national government had to create a fund which might be loaned to the railroads for the purpose of rehabilitating them. Is there any reasonable and thinking man who has paid the slightest attention to the subject matter who can be heard to maintain the doctrine that governmental operation, not to speak of governmental ownership, was a success?

The argument is generally advanced that in the early construction days of the railroad and other utilities the public was defrauded by wild cat financing, and as a result thereof, public opinion is prejudiced against utility corporations in general. These charges may or may not be true but we know that under the present system of public regulation these abuses can no longer exist. We know that as a result of the depreciation in all values resulting from the Great War that any "water" which might have existed in these properties has been thoroughly squeezed out and cannot get back in.

We have noted many changes in the functions of the government during these later years and many enterprises and duties have been assumed by the state and national governments which were not dreamed of by the founders of our system, and it may be necessary to continue the experiments even to the extent of taking over the utility corporations in order to convince the public at large that such is not the proper method and manner of operating them.

It stands to reason that no business enterprise dependent upon the varying changes of political thought can be operated by the public in as efficient, methodical and careful a manner as can a similar business enterprise managed by a body of men who have their capital invested therein, or who represent those who have invested their fortunes therein. Destroy private ownership with public regulation and the next step is government ownership and government operation. When that time comes, if it does, our system of government will have changed to meet it. In order to take over and operate these properties at a less cost than their owners can operate them, it will be necessary to confiscate all or a large portion of the actual value of the properties; and if that can be accomplished it will be notice to the world that our constitution has changed, and that our courts are no longer able or capable of protecting private property from public confiscation. We believe that the present system of private ownership and private operation with public regulation as is now the custom in this country, is the proper, logical and indeed the only just, equitable and honest manner of conducting the great public utility business of this country.

The report was signed by P. J. Lucey, of Illinois, chairman. George R. Van Namee, of the second district, New York, commission, a member of the committee, declined to sign the report. It was ordered printed.

Judge Anderson Advocates

Unification and Federalization

Hon. George W. Anderson, of Massachusetts, judge in the United States District Court, and formerly a member of the Interstate Commerce Commission, addressed the convention, proposing that state railroad commissions function as regional federal commissions. Judge Anderson said he saw no solution of the railroad problem until the railroads should be both unified and federalized. He criticized the transportation act but asserted that it will be found to go much farther toward essential federalization than has yet been generally recognized. He referred to the rate-making provision as "a clumsy pooling device sure to produce an expensive crop of expensive rate-division litigation." The results since March 1, he said "are hardly less than appalling" and he could find "no sign of economy and hardly a sign of efficiency." Under the law, he said, the state commissions will be gradually shorn of most of their powers and he proposed that Congress give them something to do by delegating to them matters of local regulation as representatives of the federal government.

Officers were elected on Wednesday as follows: President, J. A. Perry, Georgia; first vice-president, Carl D. Jackson, Wisconsin; second vice-president, Dwight N. Lewis, Iowa; secretary, James B. Walker, New York, and assistant secretary, L. S. Boyd, librarian of the Interstate Commerce Commission.

Labor Board Continues

Short Line Hearings

AFTER AN adjournment of six days to permit voting, the Railroad Labor Board resumed its public hearings on the wage demands of employees of the short lines on November 4, completing the executive's presentations on November 8 and starting an investigation as to the origin of a fraudulent interpretation circulated throughout the country before adjourning on November 8 until November 22. On that and subsequent days the employees' and executives' rebuttals and sub-rebuttals in the short line case will be heard.

The progress of the hearings up to and including the sessions on October 28 was outlined in the issues of *Railway Age* of October 29, (page 747), and of November 5, (page 786).

On November 4 the following roads were represented before the Board by the executives indicated: The Detroit Bay City & Western, A. C. McDannel, general superintendent; the Green Bay & Western, C. H. Smith, superintendent; the Lake Erie, Franklin & Clarion, H. M. Johnston; the Copper Range, G. H. Wescott, general manager; the Delaware & Northern, Andrew M. Moreland, president; the Wabash, Chester & Western, J. Fred Gilster, receiver; the Butte, Anaconda & Pacific, Paul Benedict, assistant to the president; the Chicago & Illinois Midland, Maurice Dailey, general manager, and the Greenwich & Johnsonville, Mr. Bates. W. A. Pattberg, F. A. Lewis, and Mr. Cowan, representing the employees of the Delaware & Northern, presented their side of the controversy, insofar as that road is concerned.

The public hearing on November 6 was devoted entirely to B. G. Dahlberg, vice-president of the Minnesota, Dakota & Western and L. H. White, general manager of the Boyne City, Gaylord & Alpena who testified on behalf of their lines. Judge R. M. Barton, chairman of the Board, announced at this session that arguments in this case would begin on November 22.

W. T. Hargrett, representing the Live Oak, Perry & Gulf, testified on behalf of that line before the Board on the

afternoon of November 8 and subsequently Chairman Barton called an adjournment until November 22.

The testimony presented to the Board by these representatives of various short lines was similar to that already described in the previous reports of this case. Each representative outlined the physical, financial and other characteristics of his line, the prevailing wages and working conditions, the traffic arrangements and tendencies, its operation and other factors which the Board must consider before it makes a decision.

Board Inquiries as to Origin of Fraudulent Ruling

On November 8 the Board instituted an open investigation as to the origin of a fictitious interpretation of its Decision 2. This interpretation alleged to have been issued by the Board and to have been signed by the chairman was called to the Board's attention by J. G. Walber, secretary of the Bureau of Information of the Eastern Railways and W. N. Neff, chairman of the Southwestern Railway Executives' Association.

The hearing, which was conducted by the Board's attorney, L. G. Brooks, first developed that the alleged ruling, reading as follows, has been widely circulated among railway labor leaders throughout the country:

"(1) Employees leaving the service for any reason or cause prior to June 12, 1920, are entitled to receive back pay from May 1, 1920, to the date of their separation from the service. The reason for this ruling is, that the Labor Board did not issue their notice until June 12, 1920.

"(2) Employees leaving the service from any cause or reason on and after July 20, 1920 (date of the wage award by the Labor Board) are entitled to receive back pay.

"(3) Employees dismissed from the service at any time subsequent to May 1, 1920, or employees laid off account reduction in the force on and after May 1, 1920, are entitled to receive back pay.

"(4) Employees leaving the service of their own accord between the dates of June 12, 1920, and July 19, 1920, inclusive, are not entitled to receive back pay.

"Signed"—or purporting to be signed—"R. M. Barton, Chairman, U. S. Ry. Labor Board."

Mr. Walber, Mr. Neff, E. T. Whiter, chairman of the Conference Committee of Managers, E. F. Grable president of the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers, John Scott, secretary-treasurer, and James F. McGrath, vice-president, of the Railway Employees' Department of the American Federation of Labor, R. A. Davis, secretary-treasurer of Division 2 of the Railway Employees' Department and W. J. Fitzinger, general chairman of the carmen on the Central Railroad of New Jersey, were called as witnesses.

Mr. Walber, Mr. Neff and Mr. Whiter outlined the manner in which the fraudulent interpretation had been brought to their attention. The circular issued by Mr. Grable's organization and containing the interpretation stated that he had certified the ruling as authentic. When questioned as to this, Mr. Grable stated that the circular in question had been issued during his absence from his office on account of sickness and that as soon as his attention was called to the ruling, he had issued orders for the recall of the circular.

Further questioning of Mr. Grable and the other labor representatives developed the fact that the ruling was first promulgated by a "National Agreement Interpretations Committee" composed entirely of representatives of the various labor organizations. This interpretation was later attributed to the Board, the chairman's name appended and circulated throughout the country.

At the close of the hearing Chairman Barton indicated that the Board would continue the investigation and the representatives of both the carriers and the employees offered their fullest co-operation.

Correction

The report of this hearing in the *Railway Age* of October 29 (page 748) stated that W. L. Seddon, representing the Macon, Dublin & Savannah, the Raleigh & Charleston, the Charlotte, Monroe & Columbia, the Tampa Northern, the Tampa & Gulf Coast, the East & West Coast and the Florida Central & Gulf, testified that Decision No. 2 of the Board had been applied to these lines and that therefore they were not properly before the Board in the short line case. Mr. Seddon has called attention to the fact that Decision No. 2 has not been applied on these lines and that he offered no technical objection as to the manner in which the dispute had been brought before the Board.

Car Service Under Private and Under Government Operation

WASHINGTON, D. C.

THE CAR SERVICE DIVISION of the American Railway Association, at the request of one of the railway executives, recently prepared a memorandum in reply to some comparisons between government and private operation of the railroads made by W. G. McAdoo in a speech at Indianapolis on October 16, as quoted in newspaper accounts. The memorandum, which was written before some of the August statistics, which make possible an even more favorable comparison in favor of private operation, were available, is as follows:

"It is assumed, of course, that the figures used by Mr. McAdoo, in that part of his speech referring to car service, were obtained from data compiled by the Railroad Administration. If this is the case, these figures were compiled by the Car Service Section of the Railroad Administration of which the present Car Service Division of the American Railway Association is the successor, and which has both the records from which the data quoted by Mr. McAdoo was compiled and also a continuation of similar records under the Car Service Division. The Car Service Division has made an analysis of the published statements of Mr. McAdoo referred to above, and makes the following comments:

"The article states that 'The former director general of railroads asserted that under government operation there had been an actual car surplus in the crop moving season of 1918, and surplus in 1919 except during the coal strike, in contrast with a shortage placed at 143,349 on September 1 of this year.'

"The railroads were taken over by the government as of January 1, 1918, during the war period when, under the existing emergency, the entire transportation facilities of the country were devoted to war purposes. It is recalled that the commercial interests not essential to the war were being curtailed by the various agencies of the government, and necessities for transportation thereby were correspondingly reduced. This reduction provided ample transportation for war purposes, and it was further possible to set to one side in the grain producing territory a reserve supply of box cars in anticipation of the heavy initial movement at the time of harvest. This reserve supply of from 40,000 to 50,000 cars was exhausted shortly after the time of harvest and after the initial movement there was no available surplus. It is not entirely proper to credit this as a surplus in comparison with previous years, as the practice but followed the custom of railroads under private operation when they individually set to one side their estimate of initial requirements according to crop conditions.

"Following the armistice in November demands for transportation rapidly decreased so that in the following March (1919) there was a peak period of surplus of between 400,000

and 500,000 cars. This again made it possible for the railroads in the spring and early summer of 1919 to store in the crop producing territory box cars to the extent necessary to care for the initial movement and approximately 50,000 cars were thus set to one side.

"The resumption of business activity in the early summer of 1919 and which increased rapidly entirely dissipated the surplus. This factor coupled with the railroad shopmen's strike in August, 1919, turned the scale so that by September, 1919, shortages were again being reported. Such shortages were also reported in October, while the coal strike did not take place until November 1 of that year. Mr. McAdoo is, therefore, in error in the reported statement that 'there was a surplus in 1919 except during the coal strike.'

"This shortage has continued in varying amounts up to the present and has been due to the constantly increasing demand for transportation following the return to pre-war industrial conditions. Beside the normal increase there was a considerable excess demand from those industries which had been curtailed during the war; furthermore, conditions were aggravated by the switchmen's strike beginning early in April and which lasted for several weeks thereafter. These conditions made it impossible for the railroads during the spring and early summer of 1920 to set any cars to one side in anticipation of the grain movement. For this reason the initial movement of grain following the harvest this year fell somewhat short of the records of the two previous years, inasmuch as the car supply for grain movement, demand for which is heavy at the start, had to be taken from cars available for general distribution on a prorata basis. The car supply has since been adjusted so that grain loading compares very favorably with that of previous seasons.

"Mr. McAdoo further states:

"Use of all cars on all railroads under single direction under federal control had increased the freight carrying ability of the cars by 15 per cent, producing the equivalent of 300,000 new cars without the cost of a penny.'

"We do not know by what measuring stick Mr. McAdoo arrives at his estimate, but presumably the most accurate unit in measuring railroad operations is expressed in ton miles per car per day. The following statement as to ton miles per car per day is therefore of interest:

During 1917, under private operation average performance.....	495
During 1918, under federal operation.....	491
During 1919, under federal operation.....	441
First two months of 1920, under federal operation.....	455
During March, 1920, under private operation.....	487
During April, 1920, under private operation, affected by switchmen's strike.....	401
During May, 1920, under private operation.....	488
During June, 1920, under private operation.....	504
During July, 1920, under private operation.....	523

"It should in fairness be said that the low figure for 1919 was due to the slump in demands for transportation during the first six months of the year.

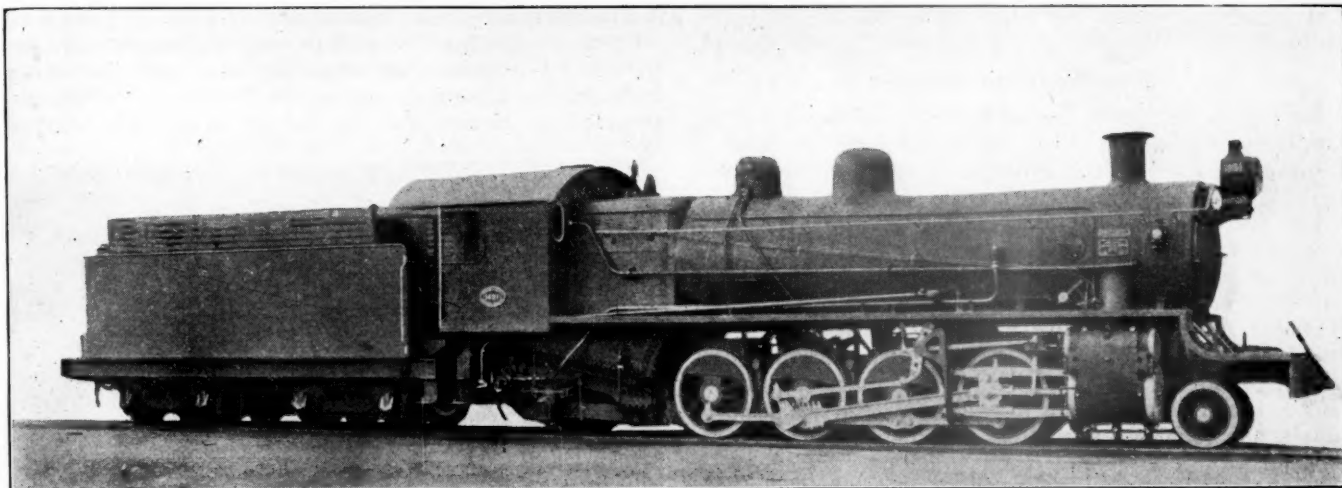
"The total cars of revenue freight loaded for the year 1919 and the first two months of 1920 under federal control averaged, per month.....	3,552,481
"The corresponding average for the succeeding seven months under private control was.....	3,755,145

"Similarly the miles per car per day for 1917 averaging 26.1 was in excess of the corresponding figures under federal control which were 24.9 and 23.1, respectively, while under private control following the switchmen's strike in April the figures have shown a consistent increase—

May, 24.2; June, 25; July, 26.1.

"All of the above would not seem to in any way substantiate Mr. McAdoo's deduction as to a 15 per cent increase in the freight carrying ability of the cars under single direction."

THE PACIFIC RAILWAY CLUB met November 8 in Oakland, Cal. The topic for the discussion at the meeting was "The Future of Ferry Transportation."



Meter Gage Mikado for the Central de Cordoba

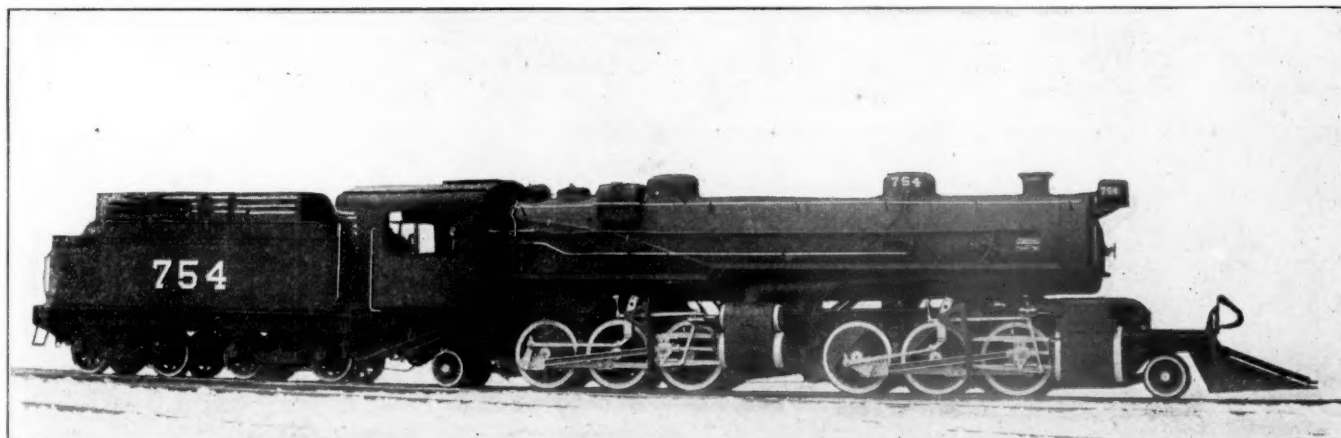
New Meter Gage Locomotives for South America

Description of Mallet, Mikado and Santa Fe Type Locomotives Designed for Narrow Gage Lines

CONDITIONS following the war have placed the locomotive builders of this country in an advantageous position to figure on export business and statistics relating to exports from the United States during the current year indicate that the builders have taken full advantage of this situation. There is no question but that they have a relative advantage in their ability to effect early deliveries. Moreover, the strong financial condition of the builders has enabled them to negotiate business that might not otherwise be

view. Many locomotives have been constructed to the metric system of measurements throughout, and, there are not many locomotives exported that do not deviate from domestic standards in many important details so as to conform to the particular standards of the foreign user. For instance, locomotives recently shipped to India in competition with British builders are constructed with plate frames in conformity with the usual English practice.

On the other hand, the situation referred to has made it



Meter Gage Mallet for the Magyana Railway of Brazil

available and their representatives have shown breadth and foresight in dealing with the export situation. The acceptance of large quantities of fuel oil from Rumania in payment for locomotives which that country would have found difficult to purchase on any other basis, as described in a recent issue of the *Railway Age*, has been commented on as an instance of unusual initiative in the export field.

The statement has been made that American manufacturers are not as generally inclined to adapt their merchandise to the peculiar tastes of the foreign user as European manufacturers are. A study of the designs of locomotives recently built in this country for export would tend to contradict this

possible for American builders to impress upon foreign users many of the advantages in locomotive construction which have developed in this country. Within the last few months this country has exported to South America Mallet, Mikado and Santa Fe type locomotives designed for meter gage railroads. These locomotives are conspicuous for their high capacity, which compares quite favorably with the capacity of many locomotives operating in this country on standard gage lines.

The use of many specialties designed and built in this country has become almost universal on locomotives built for export, and many of the locomotives recently exported

lead our own domestic locomotives in the number of labor-saving and efficiency and capacity-increasing devices applied.

The Mogyana Mallet

Meter gage locomotives constitute but a small portion of the number constructed for export, but at the same time serve to illustrate the wide variety of designs encountered, and more particularly the possibilities with respect to size and capacity.

The first of an order of 6 Santa Fe type locomotives to be locomotives recently constructed for South America by the American Locomotive Company are excellent examples of what may be accomplished in this line.

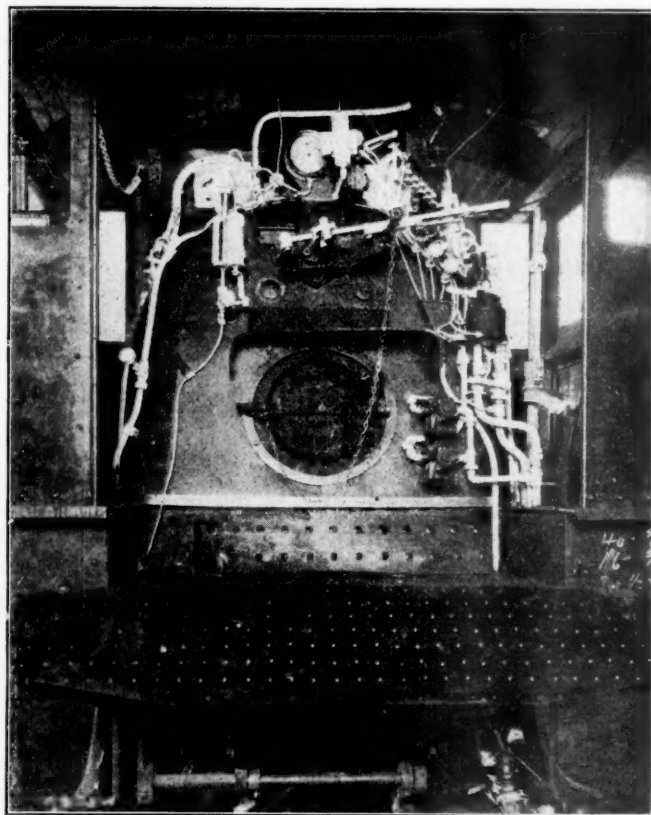
The Mallet type locomotive for the Mogyana Railway of Brazil is an unusually heavy locomotive for narrow gage service. Four of these locomotives have been shipped to Santos, Brazil. In addition to being equipped with superheaters, the following specialties are applied: Both power gear and hand lever reverse; steam brake on locomotive and vacuum brake connections for trains, Alco flexible expansion stays, copper staybolts in firebox tube sheet and back sheet (other bolts of iron). The back tube sheet and firebox back sheet are of copper, while the crown and side sheets are of steel. An interesting detail in connection with these locomotives is the fact that the specifications call for polished hand rails and a running board with polished edges. Appearance is an important factor on all South American locomotives, and great pride is taken in keeping all locomotive fixtures, particularly the apparatus in the cab, in a state of spotless perfection.

The Mogyana Railway is one of the largest narrow gage railways in South America. Its equipment includes 176 locomotives, 284 coaches and 2,618 freight cars. Wood is used for fuel.

Mikados for the Central de Cordoba

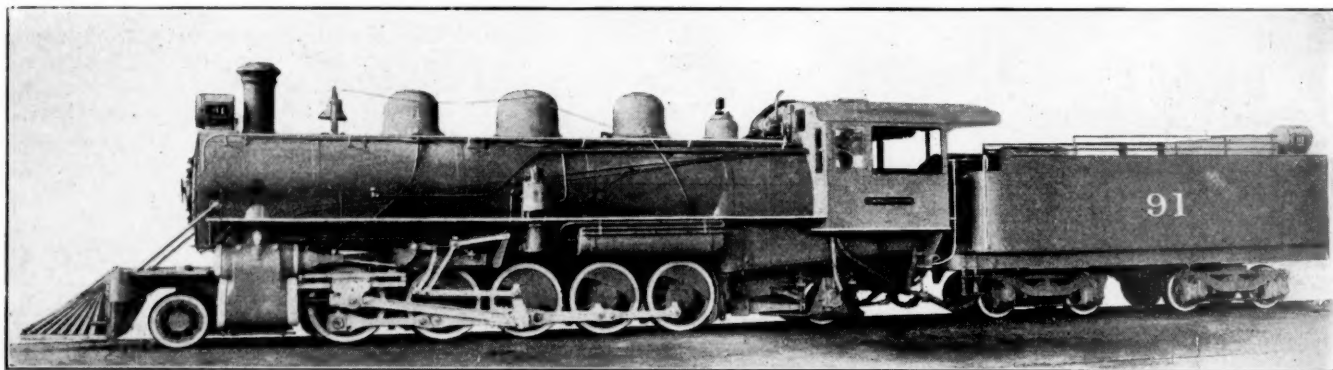
The American Locomotive Company has recently shipped five Mikado type locomotives to the Central de Cordoba in Argentina, which are of unusual capacity, considering the fact that they are of meter gage construction. In fact, the tractive effort of these locomotives is not greatly exceeded by that of the Mallet type just described. However, the Mallet locomotive is designed to operate on a 22 deg. curve, while the Mikado locomotive is designed for a maximum curvature

The locomotives have superheaters and are equipped with a pyrometer graduated in both degrees, Fahrenheit and Centigrade. The steam gage is marked in pounds per square inch, and in kilograms per square centimeter. There are two Dewaner water gages, but no gage cocks. The boiler is



Cab Interior Meter Gage Santa Fe Locomotive

of the Belpaire straight top type, and Alco flexible expansion stays are used. The vacuum brake, excepting the ejector, was supplied by the New York Air Brake Company. A 30/20 Dreadnaught ejector, using a separate steam brake



Meter Gage Santa Fe Type for the Paulista Railway of Brazil

of 16 deg. These locomotives are built to haul 1,000 metric tons up a $1\frac{1}{4}$ per cent grade. The details follow British standards more closely than is the case with the Mogyana Mallets. The Whitworth form of 11 threads per inch is used for all fittings screwing into the boiler. Whitworth standard threads are also used for all parts that use a nut and all studs that screw into parts other than the boiler sheets. The pipe threads are British standard, but the internal threads of outside purchased fittings are cut to the maker's standard.

valve, is applied. A number 9 Metcalfe hot water injector is applied on the left hand side of the locomotive, and a number 10 hot water injector of the same make is applied on the right hand side.

First Santa Fe Types for South America

The first of an order of 6 Santa Fe type locomotives to be operated in South America were recently shipped from the Eddystone plant of the Baldwin Locomotive Works direct to Santos, where they are now being erected in the Sao Paulo

Railroad shops for the Paulista Railway of Brazil. These locomotives are an excellent example of the development that has been accomplished in the design of high capacity engines working on a gage restricted to one meter. They are the first Santa Fe type locomotives to be put in operation in South America and are the most powerful single-expansion locomotives ever operated in Latin America. Up to the present time the only other foreign railway that has ordered the Santa Fe type of locomotive is the Lourenço Marques, Portuguese East Africa.

The Paulista railway, which is considered one of the most progressive and efficiently managed roads in South America, contemplated the purchase of either Mikado or Santa Fe type locomotives to move the increased amount of freight from the coffee plantations to Rio Claro and Jundiahy. As the Santa Fe type will develop approximately 25 percent more tractive effort than the Mikado type of the same restricted wheel loading, it was decided to use this type for main line freight service. As can be seen from the specifications, they will be comparable in respect to size and power, to standard gage American locomotives, and are equipped with up-to-date labor-saving devices. The maximum tractive effort is 32,000 lb. The firebox being placed behind the drivers and over the rear truck, allows an exceptionally wide and deep firebox to be used, which is necessary, as either coal or wood may be used for fuel. The equipment includes Westinghouse air brakes, Southern valve gear, electric headlights, automatic sanders, spark-ejectors and electric pyrometers.

With the shipment of these locomotives was included a long flat car of 5 ft. 3 in. gage, also manufactured by the Baldwin Locomotive Works, on which the locomotives are to be mounted when erected at Santos. They will thus be carried over the Sao Paulo Railway to Jundiahy, and then put in operation on the meter gage road.

Principal Dimensions

The chief dimensions of these locomotives are as follows:

General Data:	American Locomotive Company		Baldwin Locomotive Company
	Mallet type	Mikado type	Santa Fe type
Gage	39¾ in.	39¾ in.	39¾ in.
Service	Freight	Freight	Freight
Tractive effort.....Simple	46,800 lb.		
Compound	39,000 lb.	35,300 lb.	32,000 lb.
Weight in working order....	185,000 lb.	163,000 lb.	164,500 lb.
Weight on drivers.....	156,000 lb.	121,500 lb.	130,000 lb.
Weight on leading truck....	14,500 lb.	18,000 lb.	13,000 lb.
Weight on trailing truck....	14,500 lb.	23,500 lb.	21,500 lb.
Weight of engine and tender.	278,900 lb.	271,000 lb.	256,000 lb.
Wheel base, driving.....	8 ft. 4 in.	13 ft. 6 in.	15 ft. 10 in.
Wheel base, total.....	39 ft. 2 in.	29 ft. 8 in.	30 ft. 4 in.
Wheel base, engine and tender	63 ft. 3 in.	56 ft. 1¼ in.	57 ft. 5 in.
Cylinders:			
Kind	H. P. L. P.		
Diameter	16½ in. 26½ in.	21½ in.	20 in.
Stroke	24 in.	24 in.	22 in.
Wheels:			
Driving, diameter over tires..	45 in.	48 in.	42 in.
Engine truck wheels, dia....	24½ in.	31 in.	28 in.
Trailing truck wheels, dia....	24½ in.	31 in.	28 in.
Boiler:			
Working pressure.....	200 lb.	180 lb.	190 lb.
Inside diameter.....	60 in.	65 in.	62 in.
Firebox, length and width...	101¾ in. by 52¼ in.	81¼ in. by 63¼ in.	96¾ in. by 60¾ in.
Tubes, number and diameter..	104—2½ in.	160—2 in.	129—2 in.
Flues, number and diameter..	21—5¾ in.	27—5¾ in.	22—5¾ in.
Tubes and flues, length.....	20 ft.	17 ft. 6 in.	19 ft. 1 in.
Heating surface, tubes and flues	1,803 sq. ft.	2,119 sq. ft.	1,871 sq. ft.
Heating surface, firebox.....	131 sq. ft.	147 sq. ft.	129 sq. ft.
Heating surface, total.....	1,934 sq. ft.	2,266 sq. ft.	2,000 sq. ft.
Superheater heating surface..	506 sq. ft.	570 sq. ft.	500 sq. ft.
Grate area	36.9 sq. ft.	35.6 sq. ft.	40 sq. ft.
Tender:			
Water capacity.....	4,000 gal.	5,400 gal.	4,500 gal.
Coal capacity.....			8 tons
Wood capacity.....	4 cords	4 cords	

THE GREAT LAKES TRANSIT CORPORATION has renamed its steamer Wilkesbarre the Edward E. Loomis in honor of the president of the Lehigh Valley Railroad.

A New Study of Rail Creeping

THE CREEPING OF RAILS has been a subject of investigation and discussion among railway engineers for many years, particularly among the officers of the track department. It is of particular interest to learn that the latest study of this subject to be carried out at any length has been made by a bridge engineer, Dr. J. A. L. Waddell, consulting engineer, New York City. This investigation was undertaken through the issuance of a questionnaire containing 16 queries sent to the federal manager or president of each of 70 of the principal railroad systems of the United States, Canada and Mexico. The information thus obtained, together with the conclusions based thereon, has been made the subject matter of a paper presented before the American Society of Civil Engineers on November 3. Dr. Waddell summarized the conclusions reached as a result of his study as follows:

The principal troubles caused by rail creeping are slewing of joint ties and bunching of all ties; distortion of gage; loosening of joints; pounding down of rail ends; grinding of railheads and wheel flanges; splitting of joint ties; churning and sliding of ties; splitting and breaking of angle-bars; shearing of bolts; cutting of ties and consequent starting of decay therein; loosening, pulling and shearing of spikes; bunching and squeezing out of ballast; kinking and waving of rails; breakage of track; kicking or buckling of track with consequent derailment; interference with operation of frogs, switch-points, signals, interlocking, crossings, derails and other track devices; injury to rolling stock due to rough riding track; and, in short, the augmenting of all the difficulties known to trackmen.

Undoubtedly, the primary cause of the fundamental trouble is traffic; because, when a stretch of track is absolutely idle, there is no creeping on it whatsoever. It is true that other influences, such as temperature changes and weather conditions, aggravate the difficulty; but, alone, they are powerless to cause it. Wave action of rails and ties in front of the passing wheels pushes the rails ahead; and, if these are firmly spiked to the ties, the latter move forward, carrying the ballast with them. Again, the traction of the locomotive drivers and the friction of all braked wheels tend to impart a longitudinal motion to the rails. Long cars and widely spaced axles and trucks augment materially the amount of creeping, as does also unbalanced traffic; but these are unfavorable conditions that may very properly be termed unavoidable. The principal avoidable ones, however, are yielding roadbed, lack of thorough drainage, soft or decaying ties, unequal spacing of ties, badly adjusted super-elevation of outer rails on curves, rails too light for the traffic, inefficient or badly maintained rail-joints, either scant or excessive provision for rail expansion, inadequate or defectively maintained gage, poor or insufficient ballast, and improper use of train brakes. If the avoidable evils thus listed were effectively corrected, a large proportion of the trouble experienced from creeping track would no longer exist.

Rail creeping increases with the amount of traffic, although not necessarily in direct ratio; is greater on down grade than on up grade; on a single-track line is larger in the direction of the preponderance of traffic; in general, is of like amount on tangent and on curve; is often quite different on the opposite rails of a track; is of more serious import on light rails than on heavy ones; is less with firm roadbed than with soft; decreases with improvement in quality of ballast and with augmentation of its depth; varies with changes of temperature, season of year, and weather conditions; is reduced by improving the character of rail-splicing; is not materially affected by the use or non-use of tie-plates; enlarges with the spacing of wheels and trucks; and augments with the speed of trains and with the weights of engines and loaded cars.

In respect to the longitudinal forces in track developed by creeping and the horizontal pull between rail-anchors and rails—this is a question to be settled by experiments and not by mathematics. A few valuable experiments have been made to determine the longitudinal thrust of track for creeping, but the results thereof require confirmation by an elaborate series of tests before being accepted as standard or final by railroad men. The inauguration and carrying out of such a series of experiments is naturally the function of the American Railway Engineering Association; and the writer hopes that that organization will soon undertake such a series of tests as will settle this question with sufficient accuracy for all practical purposes.

In respect to rail-anchors or anti-creepers, these may be divided into two general classes, *viz.*, those which attach to the ties and those which are buried in the ballast. The former type is often effective when the track conditions are first class, but usually fail when they are not, and in that case the second type should be used. To be really effective, however, the latter should extend into the ballast well below the elevation of the bottoms of the ties, because otherwise they would move along with the ballast between the ties, which ballast, of necessity, travels with the track.

In respect to the prevention of rail creeping on important bridges, the writer's practice is to fasten the rails firmly to the deck at the middle of each span and let them slide on tie-plates out to the ends thereof, where a break in the track over each pier is provided.

Finally, the writer desires to state that the effective drainage of both roadbed and right of way is the main essential in good railroad engineering practice.

Tries to Help Railroads

Collect Guaranty

WASHINGTON, D. C.

HOPE THAT the government may find a way for making immediate payment to the railroads of funds due them under the guaranty provisions of the transportation act is expressed by the Board of Directors of the Chamber of Commerce of the United States.

At a meeting held on October 7, the directors of the chamber passed a resolution expressing the earnest desire of the board that a way may be found quickly for making immediate payments on account of the government's guarantee in order that the roads may use these funds to liquidate the obligations incurred during the guarantee period, and also that all of the government's financial transactions with the roads may be expedited to the end that no delay on the government's part may retard provision of railroad equipment adequate for the transportation services that are so urgently needed at this time.

Members of the chamber are requested to consider carefully the action taken by the board of directors, and if this action meets with approval and they desire to support it, it is suggested that they can accomplish this purpose by addressing a communication by letter or telegraph to the President and to the Secretary of the Treasury supporting the position already taken by the board of directors of the Chamber of Commerce.

In a circular issued to its members the Chamber sets forth in some detail the situation brought about by the decision of the comptroller of the treasury that the Secretary of the treasury is not authorized to make payments to the roads under the guaranty for March-August, 1920, until the Interstate Commerce Commission has ascertained and certified to the Treasury the entire amounts necessary to make good the guarantee to each railroad. The position of the comptroller is that the Treasury cannot make partial payments on account,

but must wait for a final accounting from each railroad and make a single payment in final settlement.

"The total amount of the operating deficit for all roads during the guaranty period," says the circular, "was about \$634,000,000. Of this amount approximately \$234,000,000 has already been paid to the roads in the form of advances requested before September 1, 1920. The railroads are, however, very much in need of the \$400,000,000 still due. Some of them are facing strikes because of their inability to pay the wages due their employees under the retroactive provisions of the recent wage decision of the United States Railroad Labor Board. Others are unable to secure the necessary funds to provide any new facilities and equipment or even to maintain their present facilities and equipment. None of them can expect that their credit will be fully restored at once by the new rate schedule which went into effect September 1, 1920.

"It is therefore of great importance to the financial stability of the roads, and is obviously in the public interest, for United States government officials to find some way to pay promptly the amounts due to the railroads from the government.

"The Interstate Commerce Commission interprets the law to mean that it is the duty of the commission to ascertain at the earliest possible date definite amounts that are due to the railroads under the guaranty provisions of the act and to certify these amounts to the Secretary of the Treasury for immediate payments to the railroads. This the commission has done but, on the advice of the comptroller of the treasury, the Secretary of the Treasury has refused to make partial payments on account of amounts due as recommended by the commission and has asked that each road be required to make a final accounting before any further payments are made, and that the commission present a single certificate for each road that will serve as a basis for a single warrant making final settlement of the amount due to that road under the guaranty provisions of the Act.

"It is thus evident that the comptroller of the treasury, who is the law officer of the Treasury Department, interprets the guaranty provisions of the transportation act in one way, and the Interstate Commerce Commission interprets them in another; and that if the amounts due to the railroads are to be paid promptly these two opinions must be reconciled on some basis that will permit partial payments. In an order dated October 18, 1920, the commission outlined the form to be used by carriers in presenting their claims under the guaranty provisions of the act, and ordered each carrier to file its claim on this form on or before January 1, 1921.

"After the claims are filed it will be necessary for the commission to review and adjust the amounts in accordance with the provisions of the act before the commission can ascertain the total amounts due and certify them to the Secretary of the Treasury for final payment. In some cases this process may require many months or perhaps years, and meantime large sums of money which the government agreed to pay to the railroads to enable them to take care of their current expenditures during the guaranty period will be kept from them."

DELAYS TO PASSENGER TRAINS on the Pennsylvania Railroad, due to locomotive failures, during six months have amounted to an average of 67 minutes for every 10,000 miles, and a record for one month shows that for every 10,000 passenger car miles, the total delays to trains due to car trouble, such as a hot box, amounted to 3.9 minutes. The total number of minutes lost by all of the 129,745 passenger trains on the whole railroad because of locomotive and car trouble, in September, was 53,183, as compared with 60,792 in April, when 106,508 trains were operated.

August Breaks Freight Traffic Record

Statistics Also Show Improvement in Efficiency. Weekly Freight Car Loading Makes New Record for Year

WASHINGTON, D. C.

ALL RECORDS for the amount of freight handled by the railroads of the United States in a single month were again broken in August, following a record-breaking performance in July, according to statistics just compiled by the Bureau of Railway Economics.

The net ton miles totalled 42,706,835,000, which represents an increase of 6,345,000,000 over August, 1919. The August freight traffic also represents an increase of 2,574,000,000 ton miles over July, 1920, which, according to a recent statement by the Interstate Commerce Commission, exceeded the greatest volume of traffic previously recorded for any single month.

Material progress in the campaign to speed up the movement of freight cars is shown by the report. The average mileage per freight car per day was 27.4, as compared with 24.2 in August, 1919; 26 in August, 1918, and 27.1 in August, 1917.

An increase in the average mileage per car per day was one of the principal objectives set for themselves by the railway executives when at a meeting in New York in July they adopted resolutions pledging themselves to make every effort to attain an average of 30 miles, which has never been attained.

The average of 27.4 miles is the highest that has been reached in any month since July, 1917, exceeding the average for any month during federal control. It was exceeded in May, June and July, 1917, when the average car mileage

A new record for 1920 in the number of cars loaded with commercial freight was made during the week ending October 23, according to reports compiled by the Car Service Division of the American Railway Association. The total for the week was 1,010,961 cars, which was within 500 cars of the peak recorded in September, 1919. This was 5,298 cars more than were loaded during the previous week, 33,910 cars more than for the corresponding week of 1919, and 90,850 cars greater than for the corresponding week in 1918. This was also the third successive week that the total had exceeded the million mark.

Weekly Car Loading Report

Except for the Central, Western and Pocahontas districts, increases as compared with the same week in 1919 were reported by all districts, while the number of cars loaded in all districts during the week of October 23 exceeded the number loaded in the same districts during the corresponding week in 1918. Increases were shown, as compared with 1919, in the number of cars loaded with coke, forest products, ore, merchandise and miscellaneous freight, although decreases were shown in grain and coal loading.

The total commercial coal loading was 229,043 cars, 1,401 cars more than for the previous week. During the corresponding week last year 231,972 cars were loaded, but October, 1919, was the heaviest coal-carrying month on record, owing to the fact that in anticipation of the coal

AUGUST, 1920

Region	Average miles of road operated	Net ton-miles (thousands)	Freight car miles (thous.)			Freight cars on line daily		Efficiency ratios		
			Total	Loaded	Per cent loaded to total	Total	Unserviceable	Car-miles per day	Tons per car	Per cent Unserviceable
New England Region.....	8,134.11	1,107,355	60,612	43,658	72.0	106,060	9,186	18.4	25.4	8.7
Great Lakes Region.....	22,123.71	7,949,392	381,875	266,318	69.7	491,047	38,942	25.1	29.8	7.9
Ohio-Indiana-Allegheny Region.....	26,566.71	10,352,575	436,033	286,347	65.7	629,069	37,269	22.4	36.2	5.9
Pocahontas Region.....	5,340.44	2,631,863	99,778	61,810	61.9	85,339	7,102	37.7	42.6	8.3
Southern Region.....	37,726.21	5,025,076	256,519	182,103	71.0	272,587	19,651	30.4	27.6	7.2
Northwestern Region.....	47,421.01	5,495,176	307,841	200,709	65.2	346,444	27,631	28.7	27.4	8.0
Central Western Region.....	52,202.01	7,072,486	395,368	274,264	69.4	339,869	24,652	37.5	25.8	7.3
Southwestern Region.....	32,072.69	3,072,912	163,097	116,728	71.6	204,847	12,433	25.7	26.3	6.0
Grand total—all regions.....	231,586.89	42,706,835	2,101,123	1,431,937	68.2	2,475,262	176,866	27.4	29.8	7.1

was 29, 28.4 and 28.3, respectively. For the year 1917 the average was 26.1; for 1918 it was 24.9; for 1919 it was 23.1. Since the roads were returned to private management on March 1 the average has shown an improvement in each month except April, as compared with the preceding month and as compared with the corresponding month of 1919, but August was the first month to show an improvement in this respect over any month during 1918. An increase of one mile in the average movement per car per day is roughly equivalent to the addition of 100,000 cars.

The average freight car during the month of August also carried a greater load of freight than the average for any month since December, 1918. The average tonnage per car was 29.8, as compared with 28 in August, 1919, and 29.6 in July, 1920. The mark set by the executives was 30 tons.

The average of 29.8 tons is greater than was attained in any month during 1919, when the average for the year was 27.8 tons. It was exceeded in July and August, 1918, when the average car load was 30.1 tons, and equalled in December, 1918. For the year 1918 the average was 29.1. For 1917 it was 27 tons.

Freight car performance for August is shown in the table on this page, summarized from the bureau's bulletin.

miners' strike, on November 1, every available car was turned to transporting coal. The loading report for the week of October 23 is shown in the table on the following page.

Car Loading for 12 Weeks

For the 12 weeks ending October 23, the total revenue car loading was 11,654,567 cars, as compared with 11,291,665 in the corresponding period of 1919, and 11,431,467 in 1918. This represents an increase over 1919 of 362,902 cars, and over 1918 of 223,100 cars, and probably represents the largest volume of freight traffic for a similar period in railroad history. For the 12 weeks the cars loaded with grain and grain products totalled 495,134, against 559,693 in 1919, and livestock loading was 370,277 cars, against 419,112, but the other classes of commodities all show increases. Coal loading was 2,513,138 against 2,412,249 in 1919; coke, 176,617 against 123,019; forest products, 767,571 against 747,348; ore, 921,512 against 649,663; and l.c.l. merchandise and miscellaneous combined 6,410,318, against 6,369,805.

A decrease in the car shortage amounting to 3,552 cars was also shown for the week ending October 23. The average daily shortage for the week was 65,965, as compared

with 69,517 cars for the previous week, and 147,309 on September 1, when the peak was reached for this year. Of the total shortage for the week, 26,878 were box cars and 26,412 were coal cars.

For the week ending October 29 the car shortage was 55,412.

The report for the week of October 30 will show a de-

The immediate soft coal wants of the whole nation have already been met, according to a statement issued by the National Coal Association, excepting in a few isolated communities, while the storage of coal for winter uses in many parts of the country has begun. With the release of open-top cars from the lake movement, due to the recent suspension of the lake priority order by the Interstate Commerce

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, OCTOBER 23, 1920

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year 1920	Corresponding year 1919	Corresponding year 1918	This year 1920	Corresponding year 1919	Corresponding year 1918
Eastern	1920	5,872	2,849	59,563	3,428	7,509	10,799	49,196	107,593	246,809	240,685	224,962	262,385	258,002	249,482
	1919	6,706	3,811	60,784	3,071	7,774	5,297	26,670	126,572						
Allegheny	1920	2,329	3,720	72,552	6,388	4,031	14,551	39,802	71,079	214,452	206,751	205,659	148,302	144,506	178,377
	1919	3,226	3,960	69,962	3,876	4,375	8,675	43,112	69,565						
Pocahontas	1920	62	356	23,842	709	1,824	209	2,753	7,434	37,209	37,807	36,477	19,259	20,269	23,716
	1919	217	434	24,393	665	1,851	261	140	9,846						
Southern	1920	2,936	2,163	28,627	3,881	16,891	2,966	38,467	37,782	133,713	133,297	114,306	74,224	73,556	71,508
	1919	3,117	3,050	29,766	2,506	16,091	2,415	20,401	55,951						
Northwestern	1920	13,513	10,328	12,050	1,864	15,322	41,676	29,236	47,107	171,096	151,136	161,436	61,062	65,167	78,654
	1919	14,744	10,361	13,599	676	15,778	26,354	23,068	46,556						
Central Western	1920	10,303	12,923	25,194	475	5,703	2,738	31,098	49,010	137,444	144,019	123,033	70,920	80,005	64,392
	1919	11,682	16,295	25,683	419	5,454	2,247	24,095	58,144						
Southwestern	1920	3,851	2,632	7,215	153	7,540	243	17,632	30,972	70,238	63,356	54,238	55,757	53,010	46,070
	1919	4,329	3,665	7,785	131	5,684	331	13,001	28,430						
Total all roads	1920	38,886	34,971	229,043	16,898	58,820	73,182	208,184	350,977	1,010,951	977,051	920,111	691,909	694,515	712,199
	1919	44,021	41,576	231,972	11,344	57,007	45,580	150,487	395,064						
	1918														
Increase compared	1919				5,554	1,813	27,602	57,697		33,910					
Decrease compared	1919	5,135	6,605	2,929					44,087				2,606		
Increase compared	1919									90,850					
Decrease compared	1919												20,290		

L. C. L. merchandise loading figures for 1920 and 1919 are not comparable as some roads are not able to separate their L. C. L. freight and miscellaneous of 1919. Add merchandise and miscellaneous columns to get a fair comparison.

crease in the loading of about 37,000 cars as compared with the week of October 23. The reduction is principally in miscellaneous freight, which dropped about 25,000 cars, mainly in the Eastern, Northwestern and Southwestern districts. The loading was, however, greater than for the corresponding weeks of 1919 or 1918.

Accumulations of freight cars on hand in excess of current movement totaled 40,040 cars for the week which ended on October 29, an increase of 233 over the previous week. Of this number, 19,750 cars were being held with freight consigned for export or coastwise movement.

Coal Production

Production of soft coal during the week of October 30 not only continued above the 12,000,000-ton mark, but rose to a new maximum for the year, according to the weekly bulletin of the Geological Survey. The total output is estimated at 12,338,000 net tons, an increase of 97,000 tons over the preceding week and, except for the week of October, 1919, just before the coal strike, the largest production since the armistice. The average production per working day was 2,056,000 tons. For four consecutive weeks the daily output has been above 2,000,000 tons, the daily rate which corresponds to 12,000,000 per week, and this is the longest period on record of sustained output at that rate except during the summer of the war year, 1918. Production during the week ending November 6 was expected to show a marked decrease because of Election Day and the observance of religious holidays. Production during the first 258 working days of the year has been 452,904,000 net tons, which is 7,000,000 tons behind 1917, and nearly 42,000,000 tons behind 1918, but over 51,000,000 tons ahead of 1919. The loss of full-time output on account of transportation disability during the week of October 23 is reported as 20.8 per cent. The total coal dumped at Lake Erie ports during the week of October 30 was 1,081,275 tons, and the cumulative lake movement from the beginning of the season now stands at 20,043,000 net tons, as against 27,317,000 in 1918 and 21,870,000 in 1919.

Commission because of adequate dumpings at the lake docks, some 2,000 more cars are now at the disposal of operators and distributors in the movement of soft coal to the Middle Western States, where until recently an acute shortage prevailed.

In a speech at a meeting of the National Coal Association in Cleveland on October 26, President Wentz of the National Coal Association described the efforts of the association to prevent federal control of the coal industry and the appointment of a fuel administrator. He told of frequent conferences with Secretary Tumulty, who had received protests regarding coal shortage from many parts of the country, and demands that the President appoint a fuel administrator, and said that during the time the Interstate Commerce Commission was attempting to deal with the situation through priority orders on recommendations of the railroads and the coal operators, President Wentz or Vice-President Morrow of the Coal Association went to the White House daily for three weeks to keep Mr. Tumulty informed of what was being done, to show that it was not necessary to appoint a fuel administrator.

Because of the improvement in the coal situation following four weeks of maximum production, the Interstate Commerce Commission on November 6 issued an amendment to its Service Order No. 20, the general order giving preference to coal in the use of open-top cars, exempting from the order gondola cars having sides 42 inches or less in height. This will release for the movement of commodities other than coal several thousand cars, in addition to 170,000 cars that had been previously released in various ways.

During the week ending October 23 the railroads made a new record for the year in the number of cars loaded with coal. The total for all kinds of coal was 258,402, an increase of nearly 4,000 cars over the total for the previous week, which had also made a record for 1920. Comparisons are now being made with the heaviest month on record. For the first three full weeks of October this year the total loading of coal was 766,854 cars, or 8,233 cars less than for the corresponding period of 1919.

Burlington Asks Authority To Capitalize Surplus

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on November 5 made public the application filed by the Chicago, Burlington & Quincy for an order authorizing the company to capitalize a part of its surplus, representing earnings invested in its property, by issuing \$60,000,000 of additional capital stock to be distributed pro rata among the stockholders (the Great Northern and Northern Pacific own most of the stock), and \$109,000,000 of 6 per cent first and refunding mortgage bonds, to reimburse the treasury for money previously expended out of earnings. Of the bonds, \$80,000,000 are to be held in the treasury to be used for any lawful purpose, including dividend purposes, and the balance of \$29,000,000 is to be disposed of only for future additions and betterments after further application to the commission. The bonds are to be issued under a new mortgage, dated February 1, 1921, to the First National Bank of New York, and Walter S. McLucas as trustees.

The application, filed by Hale Holden, president, states that the property investment of the Burlington, as of December 31, 1919, was \$535,210,890, and that it had a corporate surplus of \$241,781,197. Depreciation on its equipment has been charged to the amount of \$48,514,239, and if the application is granted there will remain a corporate surplus of \$101,781,197.

The company's total capitalization is given as \$278,889,100, of which the capital stock outstanding amounts to \$110,839,100, and the funded debt outstanding to \$168,050,000. The stock and bonds in the hands of the public, per mile of road, are \$31,164.

The application describes the outstanding bond issues and mortgages to explain why the company finds it "an absolute necessity to its future expansion and growth as a railroad system to issue a new mortgage which will provide for financing its additions and betterments for a considerable period." Before the passage of the transportation act it had obtained authority from the Illinois Public Service Commission for an issue of \$109,000,000 of bonds under its general mortgage, which is so limited that not over \$300,000,000 of bonds can be outstanding under it at any time, and the rate of interest is limited to 5 per cent. It has not been considered advisable or prudent, under present market conditions, to put 5 per cent bonds on the market.

The applicant further states that the state laws relative to corporate securities provide that, in order to be legal investments for savings banks, etc., bonds shall not exceed three times the capital stock of the issuing corporation, and that it is therefore imperative, in order to make a refunding mortgage and provide for adequate future financing, that applicant increase its capital stock.

"By the proposed increase to approximately \$170,000,000," the application states, "applicant will have under the laws of such investment states a basis for a bond issue up to approximately \$510,000,000 instead of approximately \$332,000,000 as at present. Five hundred and ten million dollars is the necessary limit to enable applicant to finance its necessary additions and betterments for a reasonable term of years.

"Since July 1, 1901, applicant has invested in additions and betterments to its railway operating property the sum of \$189,070,776 out of earnings from operation which justly belonged to its stockholders, at least to the extent of two-thirds thereof, or more. For the most part, these additions and betterments added to the fair value of applicant's property and to the earning capacity thereof fully in proportion to the expenditure, only a small portion of the expenditure having been in non-revenue producing additions and betterments. During this period applicant has not increased the

aggregate of its bonds or stock, substantially financing all its improvement and betterment work out of earnings.

"This policy has resulted in the abnormal capitalization heretofore shown, and is a policy not just to the stockholders and of which they oppose the continuance."

From July, 1901, to December 31, 1919, it is stated, the company has invested from earnings in additions and betterments, road extensions, retiring bonded debt, purchase of securities of other companies and other items properly chargeable to capital account, \$191,348,478, which has not been capitalized, and its net income applicable to dividends for the past 10½ years has aggregated \$202,490,286, or an average per year of \$19,284,789.

"Notwithstanding said large amounts of net income which might have been distributed to the stockholders at the discretion of the directors, the average of all dividends paid to stockholders on the very low capitalization mentioned, for the period of July 1, 1901, to June 30, 1920, was only 8.51 per cent on the par of stock and on property investment during the same period in excess of bonded debt 3.916 per cent," the applicant states.

"The physical valuation now being carried on by the Bureau of Valuation of the Interstate Commerce Commission will support a value clearly in excess of the property investment above stated.

"A policy clearly recognized in the transportation act, 1920, is to bring all the railways eventually to substantially the same principle of capitalization, which is to be as nearly as practicable the value of their respective railways operating properties, so that the cost of transportation, as between competitive systems, and as related to the values of the properties, through which the service is rendered, shall be the same so far as practicable, so that the railways can employ uniform rates in the movement of competitive traffic and under efficient management earn substantially the same rate of return upon the value of their respective railway properties.

"Applicant's present interest and sinking fund charges amount approximately to \$7,250,000 per annum, and the issue of \$80,000,000 bonds as proposed would increase this amount by \$4,800,000 per annum. During the five and one-half years from July 1, 1914, to December 31, 1919, the average annual net income yielded by applicant's railways, plus applicant's other income, was \$17,324,704 in excess of the proposed new interest requirements, which is a large and safe margin above all dividend requirements, in respect of the proposed total \$170,000,000 of capital stock.

"The annual net income available for dividends as shown by the above statement, and present rate and traffic conditions in applicant's territory, prove that by the most conservative estimate the additional securities proposed will not impair applicant's credit or its ability adequately to serve the public as a common carrier.

"The unduly low capitalization of applicant as compared with other railroads in the same territory, and as compared with its property investment, has led to a misunderstanding on the part of the public as to the rate of return on fair value of property shown by applicant's earnings. The partial capitalization of applicant's surplus now proposed is just in relation to the capitalization of said other companies with reference to applicant's fair value, and is in furtherance of the policy of the transportation act."

The commission has announced a hearing on the application, to be held before Director W. A. Colston of its Bureau of Finance, at Washington on November 22. Notice of the application and of the hearing has been given to the governors of the states served by the road.

BERNARD DE ROMANET, a French aviator, making trial trips near Paris, following the recent races, flew one kilometer in 11.65 seconds, or at the rate of about 193 miles an hour.

A Centralized System for the Feeding of Laborers

AT THE RECENT CONVENTION of the American Railway Bridge & Building Association at Atlanta, Ga., Hunter McDonald, chief engineer of the Nashville, Chattanooga & St. Louis, Nashville, Tenn., gave an account of the organization and methods in effect on that railroad for the feeding of the laborers of the maintenance of way department. The essential feature of this system is the centralization of the purchasing and distribution of supplies, together with strict rationing. This plan was put into effect in 1918 during a period of rapidly advancing prices, and had the effect of providing the men with food of good quality without the necessity for increasing the charges to the men. The men are contented and the gangs are generally full. In case of wrecks or washouts, complete outfits are at hand to feed section men and other additional forces who have to be assembled quickly. The meals are furnished promptly, well cooked and well served, while the cost is much less to the men than they could obtain by any other method. There is no profiteering on the men, such as may often be the case where they are boarded by contractors or by the foremen.

The purchase of all supplies is assigned to the purchasing agent and a commissary agent appointed to look after it. The rationing allowance is estimated largely from the past average consumption of various articles as checked with prevailing United States Army rations that were known to be ample if proper economy and care were exercised. Thorough control over the system is obtained through a detailed accounting system which insures the proper disposition of the food in proportion to the number of men employed.

Each foreman is allowed to purchase locally dairy supplies, including fresh meat, butter, eggs and milk, equal in amount to an authorized allowance per man. At present this is 6 cents per day for bridge and building gangs, and 15 cents each per day for the foreman and assistant foreman, the only white men on extra gangs. In emergency, other than dairy supplies can be purchased locally, and during the summer season fresh vegetables and fruit can be purchased in lieu of potatoes, canned goods, etc., allowed on the ration list. These purchases are offset by deductions from the requisition, and emergency purchases must be fully explained.

The commissary agent checks all requisitions carefully and sees that they are properly balanced as to food values and in accordance with the ration allowance for the estimated number of men to be worked for the succeeding month. After the quantities to be purchased are determined, bids are solicited from reliable firms for such as are not already in stock. Complete specifications accompany all solicitations for bids. Orders are awarded to the lowest bidder on any article regardless of whether or not his bid is the lowest on all articles.

It is the duty of the division engineers to note all cases of apparent extravagance or dishonesty of cooks, and the commissary agent also calls attention to irregularities. A lunch club is operated in the purchasing department and the food for it is furnished at cost by the commissary agent. He thus makes a practical test of the quality of all foodstuffs purchased and none are sent out that are not known to be of quality specified and in good condition.

Three months after the inauguration of the enlarged plan in 1918, the balance was on the company's side of the ledger. Advances in foodstuffs and cooks' wages have again run the cost above the price charged. By the experience already gained and training of cooks and foremen, the loss has not yet reached a point where a raise in the board cost

is considered imperative. It is hoped that with the advent of lower food costs, notwithstanding recent very heavy advances in cooks' wages, the balance will again fall below the price charged. It is the purpose to feed the men at cost, and when the recent losses are made good and conditions justify, it is expected that the boarding charge will be reduced.

Temperatures in Stored Coal

A NEW DEVICE for indicating the thermal conditions of stored soft coal has been placed on the market recently by F. C. Thornley & Co., Inc., New York, and is called the Thornley coalometer. Bituminous coal has the well known property of spontaneously heating in certain spots and at varying depths. This heating does not always cause actual combustion, in the sense that the coal burns with the presence of flame, though this condition is also often encountered. There does exist almost universally, however, in stored coal of this character, a slow combustion which is even more destructive than combustion by flame, ow-

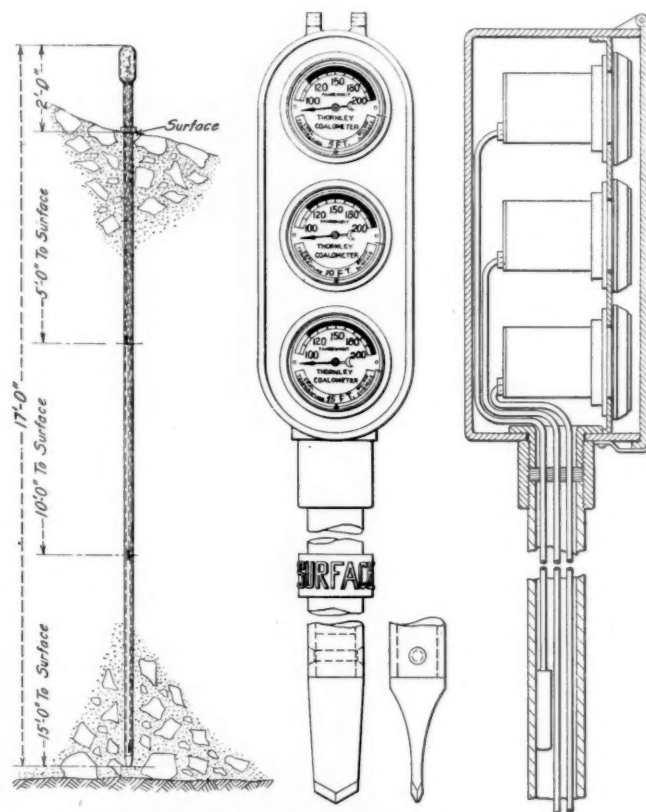


Fig. 1—Triple Unit Thornley Coalometer

ing to the fact that it cannot be so readily detected. This slow combustion goes on unnoticed throughout an ever-increasing zone beneath the surface of stored coal.

The Thornley coalometer consists of a set of temperature indicators encased in a long pointed steel tube, carrying at varying depths metal bulbs (corresponding to the bulbs of thermometers), and at its upper end a set of dials and pointers, which indicate, under all atmospheric conditions, the exact temperature of the bulbs which actuate them. These units are forced down into the coal pile to definite depths and at various points, and collectively furnish definite data to the consumer as to the exact temperatures existing beneath the surface. If an accurate record of daily readings of these instruments is kept, the slightest rise in temperature is at once detected, and should it become excessive, the con-

sumer can remove this particular portion of fuel, thus saving the greater part of the heating value of the coal which has started to dissipate.

Tests have shown that an installation of one coalometer each 50 ft. in both directions from its neighbor will efficiently indicate conditions of temperature below the surface. Thus the installation of one triple unit will protect approximately 900 tons of coal if the volume is about 50 ft. by 50 ft. by 16 ft.

A triple unit coalometer for use in coal piles from 15 ft. to 20 ft. deep is shown in Fig. 1. A galvanized steel tube, having a hardened steel diamond point drill at its lower end,

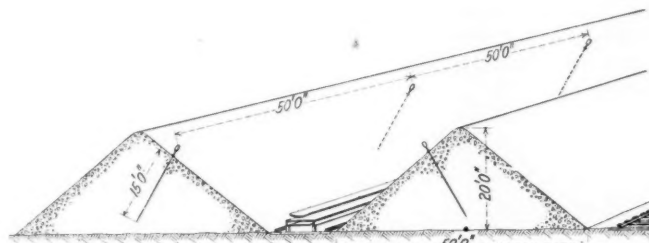


Fig. 2—Typical Installation of Coalometer

carries three pressure bulbs at depths of 5, 10 and 15 ft., respectively. Tubes from these three bulbs register temperatures in deg. F. on three dials, by means of pointers provided for this purpose. The scale on each dial starts at 32 deg. F., and is colored black. At and above 120 deg. the scale is red, indicating excessive heat at any point in this zone, and warning the coal man to remove this portion of the coal. The depth of the hot spot is determined at a glance, for the dials are plainly marked 5 ft., 10 ft. and 15 ft., respectively. The dial showing the hottest temperature thus indicates the depth at which the heat is generating.

The dials are enclosed in weathertight metal cases with thick crystal faces, and the set is again enclosed in a galvanized cast iron case. This furnishes ample protection when not in use, and added protection when in service. A slidable pipe wrench is provided on each unit to aid the rapid and easy boring of the tube to the desired depth. A large, plainly-marked lug, 12 in. below the instrument head, determines the exact depth at which the coalometer is to be placed, and thus allows of no guess-work on the part of the man who does the installing. The construction throughout is very rugged and will allow of the rapid removal and stacking of one or more units repeatedly, without fear of damage to the temperature indicators themselves. These indicators are especially constructed to indicate accurate temperatures under the varying conditions encountered throughout the year. They will indicate exact bulb temperatures regardless of the temperature of the head of the instrument, and will retain their calibration under conditions of extreme vibration or violent shocks.

Thornley coalometer units are supplied in two lengths, 12 ft. and 17 ft., which carry, respectively, two and three temperature indicators, a typical installation being shown in Fig. 2. The indicated temperatures when taken daily and recorded furnish complete knowledge of conditions beneath the surface of the coal.

THE RAILROAD COMMISSION OF THE STATE OF CALIFORNIA granted applications to provide funds for additions and betterments for refunding, collateral, reorganization and miscellaneous purposes, amounting to \$324,666,014.89, to steam railroads during the fiscal year ending June 30, 1920. There are 50 steam railroads operative, 9 steam railroads lessor, and 3 steam railroads under construction in the state.

Proposed Specifications

Classifying Old Bridges

THE CLASSIFICATION or rating of old bridges to determine their safe load-carrying capacity was one of the principal subjects of discussion at the meeting of the A. R. E. A. Committee on Iron and Steel Structures held at Montreal, Que., on August 12 and 13. Because of the importance of the subject, the tentative rules and unit stresses covering bridge ratings submitted by a sub-committee at that meeting have been published in Bulletin No. 228 of the association in order to give members an opportunity to study the rules and submit criticisms or comments to the committee. An abstract of these rules is presented below:

Before recalculating an existing bridge, a careful inspection should be made to determine: (a) whether the actual sections and details conform to the drawings; (b) the loss of metal due to corrosion and wear; (c) the general physical condition, noting defects, such as loose rivets, worn pins, cracked metal.

The equipment in actual use, or which it is supposed to use, shall be taken for determining the live load stresses. Where the design or details are such as to cause unusual eccentric or secondary stresses, these stresses shall be taken into account. It is recommended that stresses in members subject to marked secondary effects be determined by strain gage measurements.

Where speeds may exceed 15 miles per hour, the dynamic increment of the live load shall be added to the maximum computed live load stresses and determined by the formula.

$$I = S \frac{300}{300 + \frac{L^2}{100}}, \text{ in which}$$

I = impact or dynamic increment to be added to the live load stress.
 S = computed maximum live load stress.
 L = the length in feet of the portion of the span which is loaded to produce maximum stress in the member.

If a bridge is so located that speeds are definitely limited, or where absolute control of speed can be secured, 50 per cent of the impact given by the above formula shall be used when the speed is between 10 and 15 miles per hour, and 25 per cent when the speed is less than 10 miles per hour. If the bridge is located where the locomotive must be started, the speed increased, or the brakes applied, full impact shall be used in the calculations.

Impact shall be added to stresses produced by centrifugal force, but not to those produced by lateral forces.

For bridges on curves, and at other places where tracks are off center, provision shall be made for the increased load carried by any truss, girder or floor member.

In spans exceeding 150 ft. in length, and in viaduct towers, the effect of lateral (or wind) force shall be taken into account. The lateral force shall consist of a moving load equal to 15 lb. per sq. ft. on the vertical projection of the structure on a plane parallel with its axis, and a moving load of 400 lb. per lin. ft. applied 8 ft. above the base of rail.

On curves, the centrifugal force, based on actual speed of operation, the limiting unit stresses shall not exceed the following in pounds per square inch:

	Open hearth steel	Wrt. iron and Bessemer steel
Axial tension (net section).....	26,000	22,000
Axial compression (gross section).....	24,000—100 $\frac{I}{r}$	20,500—80 $\frac{I}{r}$
but not to exceed.....	20,000	17,000
Tension in extreme fibers of rolled shapes (except rolled beams), built sections and girders (net section).....	26,000	22,000
Tension in extreme fibers of rolled beams (net section).....	24,000	20,000
Tension in extreme fibers of pins (figured by assuming stresses concentrated at centers of bearings).....	60,000	50,000
Shear in plate girder webs (gross section)...	18,000	15,000
Shear in rivets and pins.....	22,000	19,000
Bearing on rivets, pins, outstanding legs of stiffener angles, and other steel parts in contact.....	44,000	38,000

The stress per square inch in the compression flanges of plate girders shall not exceed

$$23,000 - 400 \frac{l}{b}, \text{ for open hearth steel,}$$

$$\text{and } 19,000 - 300 \frac{l}{b}, \text{ for wrought iron and Bessemer steel,}$$

in which l = the length of the unsupported flange, between lateral connections or knee braces.

b = the flange width.

One-eighth of the gross section of the web, if continuous or properly spliced, may be used as a flange section.

When the calculated stresses exceed the foregoing limits, or when the design or physical condition makes it necessary, the structure shall be strengthened or renewed.

Plumb Plan Campaign Ineffective in Election

WASHINGTON, D. C.

A CHECK OF the returns from the election on November 2 against the names of the members of Congress who voted for the conference report on the transportation act last February fails to indicate that the campaign conducted by the Plumb Plan League and the railroad labor organizations, assisted by the American Federation of Labor, succeeded in carrying out their threat to place many new faces in Congress in place of those who voted for the bill opposed by those organizations.

The campaign conducted by the labor organizations was non-partisan but the returns show that most of those who voted for the bill and were candidates for re-election were re-elected, and while many who voted for the bill were defeated, the large percentage of them that are Democrats indicates that the overwhelming Republican landslide had more to do with the result than the labor organizations, although Samuel Gompers claims the credit for his organization. It also appears that the mortality among those who voted against the bill was much greater than among those who were for it, doubtless because a majority of those who voted against the bill were Democrats.

Of the 47 senators who voted for the railroad bill, only 16 were candidates for re-election. Of these 13 were re-elected, and three were defeated. Of the 17 senators who voted against the bill, only five were up for re-election. Of these, four were defeated and only one re-elected.

In the House there were 250 votes for the bill, and 150 against it. Of the 250 who voted for it the present unofficial returns indicate that 201 were elected on November 2, including two who were elected senators. Two are dead. Of the remaining 47 information is not available to show exactly how many did not run for re-election, but the best information obtainable indicates that 16 were not candidates at the primaries and that 31 were defeated either at the election or at the primaries. In some cases they were candidates for senator or governor and were defeated. Twenty of the 47 who were defeated or did not run are Democrats.

Of the 150 representatives who voted against the railroad bill, the returns now indicate that only 82 were re-elected, including one who was elected senator. One is dead. Of the 67 who were not returned to office, 59 are Democrats. Apparently about 50 were defeated and the others did not run for re-election.

Chairman Cummins of the Senate committee on interstate commerce, against whom an especially bitter contest was waged by the labor leaders as the principal author of the railroad bill which became law, and particularly as the author of an anti-strike provision which did not become a part of the law, was re-elected by the enormous Republican majority in his state.

John J. Esch, who as chairman of the House committee on interstate and foreign commerce was largely responsible for putting into the law those parts of it which labor did

not particularly object to, and who opposed some of the provisions in the law which labor has objected to most strenuously, was the most prominent victim of their campaign. He was defeated at the primaries by a combination of the labor forces with those of the LaFollette organization, who agreed in their opposition to the railroad bill, but to those who followed the legislative progress of the bills that were finally merged and submerged in the transportation act, it does not appear that labor has gained much by his defeat. The next man in line to succeed Mr. Esch as chairman of the House committee, Samuel E. Winslow, of Massachusetts, has the reputation of not being particularly friendly to the labor organizations and he was particularly outspoken in his characterization of the Plumb plan during the hearings before the committee last year. Mr. Esch not only vigorously opposed the proposed anti-strike provision, but he also opposed until the last minute the rate-making provisions which the labor organizations have attacked as constituting a guaranty, but because he declined to favor the Plumb Plan, and because he stood firm for the return of the railroads to private management, to the extent of aiding the final passage of a bill many of whose provisions he did not like, he was marked for slaughter.

On the other hand, some of those most closely identified with the labor organization forces went down to defeat. Probably the most conspicuous example is Thetus W. Sims of Tennessee, who introduced the Plumb plan bill in the House and who led the opposition to the passage of the railroad bill. Mr. Sims had been in Congress for many years and had been chairman of the House committee on interstate and foreign commerce. He was defeated.

Another advocate of the Plumb plan who will not be in the new Congress is J. M. Baer of North Dakota, who has been the cartoonist of the Plumb Plan newspaper "Labor."

W. N. Doak, for several years vice-president and legislative agent of the Brotherhood of Railroad Trainmen at Washington, ran for Congress from a Virginia district, as a Republican, but was defeated.

Results of Private Control*

By Robert S. Binkerd

THE custody of civilization is in the hands of the great mass of mankind. It is not by any social or political or economic invention but by greater leadership, by steadier and more enlightening ways of taking the public into the confidence of great and important matters, that we shall work our way forward to a better day. In assuming the competitive operation of railroads on March 1 the railway executives not only took over one of the biggest jobs of setting our National house in order, but they at the same time sank a test pit through all the supposedly popular panaceas of socialism, communism, Bolshevism and government ownership and operation as the solution of any and every problem that people are too lazy or too impatient to work out soundly.

Six months of private operation of the railroads has shown that still, as of old, the instincts of rivalry and emulation, the chance for personal gain and advancement of the individual worker, and the chance for profit and the necessity for solvency on the part of management, are the keys which unlock men's energies and give zest and meaning to their accomplishments. Six months of private operation, by its increased efficiency, without the investment of an additional dollar, has added to the transportation capacity of the country the equivalent of approximately 600,000 freight cars, which, with necessary locomotives would today cost something like two and one-half billion dollars.

*From an address before the Yale Alumni Association at Hartford, Conn., November 9, by Robert S. Binkerd, Assistant to the Chairman of the Association of Railway Executives.

General News Department

Americanization of foreign-born employees, which has been carried on by the Pennsylvania Railroad systematically for several years, has now been extended to the wives of such employees, plans looking to action in this direction having been adopted at a meeting of the Pennsylvania Railroad Women's Club, in Philadelphia, last week. The Pennsylvania Railroad Mutual Aid Society will cooperate in carrying out these plans.

Election bulletins, issued as rapidly as information was received, were read on all passenger trains of the Cleveland, Cincinnati, Chicago & St. Louis, on election day, from noon until definite results of the election were determined. These bulletins were sent from the general superintendent's office in Indianapolis, and were transmitted to every train on each division. This news service was established to further the policy of the New York Central Lines to be frank with the public, and to retain old friends and make new ones.

"The Evolution of Bridge Design," with special attention to its application to railroad bridges, was the subject of a paper by Charles Evan Fowler, consulting engineer, New York City, before the Structural section of the Western Society of Engineers, at its last meeting. Mr. Fowler reviewed the development of bridge design practice and particularly the increase in the loadings to be provided for. The paper was discussed by C. F. Loweth, chief engineer, Chicago, Milwaukee & St. Paul, G. A. Haggander, bridge engineer of the Chicago, Burlington & Quincy, and others.

Signal Engineers to Meet in New York

The Signal Section of the American Railway Association (hereafter the Signal Division) will hold its regular meeting at the Hotel McAlpin, 34th street, New York City, on Thursday and Friday, December 2 and 3. Reports of committees will be mailed early next week.

September Earnings

Returns for the month of September for 197 railroads operating 225,000 miles show a net operating income of \$75,780,000, an increase of only 3.3 per cent over September, 1919. Operating revenues increased 23.8 per cent, while operating expenses increased 27.1 per cent. On this basis it is expected that all the roads for which monthly summaries are usually published by the Interstate Commerce Commission will show a net operating income of about \$80,000,000, which is approximately \$29,000,000 short of what these roads should earn in September to produce a net return of 6 per cent.

Formula for Determining Maintenance Allowance

The adjustment committee of the Association of Railway Executives has adopted and recommended to the railroads a formula developed by a sub-committee for determining the allowance for maintenance of way and structures and maintenance of equipment for the guaranty period, March 1 to August 31. The formula was considered at a meeting of representatives of the carriers at Washington on November 5, and although there was not complete agreement as to all of its provisions any road that desires to do so may use a formula of its own or use variations for different circumstances provided in the committee formula.

A Correction

In an article in the *Railway Age* of October 29 (page 769), announcing a meeting of the member roads of the Association of Railway Executives, entitled "Executives to Meet Friday," a statement was made which indicated that the executives who were opposed to the formation of national boards of adjustment for labor matters were in the minority, but that those of them

who were flatly opposed to "nationalization" in any form might be expected to express their views at the meeting. All of this is misleading and the use of the term "nationalization" in this connection is not clear. It is understood that at no time has a majority of the railroad executives favored national boards of adjustment.

Commissioner Woolley Not a

Candidate for Reappointment

R. W. Woolley, member of the Interstate Commerce Commission, has issued a statement commenting on reports that if he is reappointed on January 1 the Senate will refuse to confirm the nomination, and that in his place Representative Esch, for whose ability and character he has great regard, will be named by President Harding. "An admirable choice, indeed," says Mr. Woolley. Nearly a year ago Mr. Woolley asked Secretary Tumulty to notify President Wilson that he "was seriously thinking of resigning from the commission in order to enter private life to my distinct financial advantage," and that he did not wish to be reappointed. He also informed his colleagues to like effect.

Farm Bureau Committees

According to the observations of an interviewer for the Illinois Central who visited a score of representative farmers in Champaign County, Ill., to secure their views on transportation problems, farmers are taking an active interest in railroad progress and are ready with suggestions for improving the relations between the railroads and their patrons. The suggestion was brought out that the chief obstacle in the way of a better mutual understanding had been a lack of information concerning railroad affairs on the part of farmers, or, more often still, actual misinformation. As a result of the investigation it has been suggested that each farm bureau organize a railroad committee of a half dozen farmers to study railroad matters, keep in close touch with local railroads and constantly be in a position to advise the farm bureau on means for co-operating to get better and more efficient service. The trip into Champaign County was the second in a series which is being made by the Illinois Central in the interest of developing better understanding of railroad problems by the farmers patronizing the railroad, and better understanding of farmers' problems by railroad officials and employees. The first visit was made a month ago to Cherokee County, Iowa.

Annual Report Under Hours of Service Law

The Interstate Commerce Commission has issued its annual statement, for the year ending June 30, 1920, on the work of its inspectors in connection with the law regulating the hours of service of trainmen and telegraphers. This is a statistical analysis giving, by names of roads, all instances in which employees were on duty for periods other than those prescribed under the federal hours of service Act. The total number of cases in which employees in train service were on duty for longer periods than sixteen consecutive hours were 67,468, as compared with 78,883 in the year ending June 30, 1919, and much larger numbers in 1918 and 1917. Cases where men returned to duty after sixteen continuous hours of service without having had ten consecutive hours off duty numbered 396 in the last fiscal year; cases of those returning to duty after aggregate service of sixteen hours without having had eight consecutive hours off duty, 159; number continuing on duty after an aggregate service of sixteen hours, 2,964. Telegraphers on duty more than nine hours in offices operated day and night numbered 33,566, as compared with 66,265 in the preceding year; 54,662 in 1918 and 25,124 in 1917. Telegraphers on duty in day offices more than thirteen hours numbered 1,948 as compared with 1,373 in 1919; 3,429 in 1918 and 3,394 in 1917.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1920

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Total.	Operating ratio.	Net from operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	Total.	Way and structures.	Maintenance of equip-ment.	Traffic.	Trans- portation.					
Alabama & Vicksburg	141	\$289,279	\$81,087	\$370,366	\$81,646	\$71,445	\$7,733	\$128,835	\$11,594	\$303,771	\$14,639	\$69,275	\$30,406
Ann Arbor	293	1,352,704	68,404	1,421,108	359,031	107,033	17,808	231,468	13,919	431,231	17,500	110,200	14,606
Atlantic Coast Line	8,830	12,152,957	4,930,905	17,083,862	3,795,041	4,243,168	18,419	6,378,077	324,989	14,922,148	958,253	2,567,372	-29,763
Atlantic & Western	93	129,429	112,103	241,532	123,461	42,953	7,313	153,348	10,911	230,621	8,928	27,493	-22,163
Atlanta, Birmingham & Atlantic	635	363,249	100,271	463,520	140,691	138,959	23,347	278,233	18,559	599,918	16,560	-120,271	-68,113
Atlantic City	177	82,728	331,699	414,427	177,668	38,368	3,483	274,889	1,226	395,286	26,398	-60,372	-60,372
Atlantic Coast Line	4,887	3,153,316	1,490,177	4,643,493	962,568	1,175,540	82,746	2,780,862	144,092	5,123,880	300,000	-41,253	-41,253
Baltimore & Ohio	90	19,940,718	3,065,887	23,006,605	24,970,399	3,045,011	2,562	10,536,283	12,283	29,553	31,169	-101,734	-38,361
Baltimore, Chesapeake & Atlantic	87	123,368	62,237	193,743	5,379	27,342	1,184	95,736	4,943	134,585	1,000	58,158	42,487
Bangor & Aroostook	638	532,910	121,569	654,479	160,613	140,702	3,394	211,910	19,720	545,823	26,564	131,963	124,496
Birmingham Southern	31	45,362	61,014	106,376	4,100	7,423	1,041	34,351	3,756	50,671	1,754	8,589	7,347
Belt Ry. of Chicago	31	2,338,880	48,206	2,387,086	224,703	408,032	1,172	270,954	9,666	450,627	24,767	49,500	-7,309
Bessemer & Lake Erie	225	5,472,031	2,778,282	8,250,313	1,586,147	1,696,819	80,212	4,657,186	287,532	8,364,860	15,800	1,004,113	653,865
Boston & Maine	2,304	118,625	7,204	125,829	5,641	20,331	25	61,318	3,259	90,574	6,244	29,657	-8,806
Brooklyn Eastern District Terminal	9	326,541	184,707	511,248	106,988	50,735	2,652	96,340	10,092	251,900	13,075	73,319	29,689
Buffalo, Rochester & Pittsburgh	589	2,117,509	37,806	2,155,315	435,618	503,144	19,827	871,464	43,221	1,685,946	17,449	452,834	396,797
Canadian Pacific (Lines in Maine)	233	123,282	37,806	161,088	130,443	50,735	3,308	103,534	4,323	170,911	13,075	108,766	-85,366
Carolina, Cincinnati & Ohio	291	626,434	56,629	683,063	68,499	157,368	20,518	287,743	28,708	599,852	45,000	141,237	-16,450
Central New England	301	772,683	829,467	1,602,150	135,687	171,588	3,555	439,696	21,351	776,157	18,225	35,085	-109,576
Central of Georgia	1,924	1,440,087	617,433	2,057,520	439,438	507,635	56,172	1,387,966	84,841	2,255,500	88,000	101,689	-106,001
Central R. Co. of New Jersey	1,686	3,851,139	1,008,798	4,859,937	620,833	1,152,140	49,912	2,333,874	109,087	4,750,963	274,967	712,410	773,508
Central Vermont	413	600,236	157,789	758,025	139,862	160,758	8,782	378,928	23,675	525,940	17,409	89,356	107,871
Charleston & Western Carolina	342	147,976	60,220	208,196	58,451	57,340	6,843	128,334	8,708	259,642	11,625	-44,151	-32,529
Chesapeake & Ohio	25,70	7,544,678	1,244,399	8,789,077	1,198,524	2,043,766	50,832	3,306,182	164,748	6,804,082	189,910	2,213,149	1,770,911
Chicago & Alton	1,050	2,059,983	704,867	2,764,850	439,438	507,635	56,172	1,387,966	84,841	2,255,500	88,000	101,689	-106,001
Chicago & Eastern Illinois	1,130	2,415,739	542,026	2,957,765	308,716	842,157	23,913	1,193,841	248,023	2,638,903	100,000	381,904	100,764
Chicago, Detroit & Can. Grand Trk. Jct.	62	206,021	111,917	317,938	139,322	26,301	1,706	83,372	4,727	135,466	4,596	91,531	2,545
Chicago & Erie	269	1,004,461	111,368	1,115,829	151,714	186,643	18,337	615,333	49,303	1,022,301	40,909	117,439	-110,644
Chicago & North Western	8,405	11,775,336	3,767,069	15,542,405	2,342,972	3,148,158	150,146	6,613,814	384,531	13,753,528	725,000	3,461,401	563,600
Chicago Great Western	1,496	1,515,463	486,249	1,999,712	246,361	385,312	31,216	660,979	62,506	2,099,285	81,836	90,618	-129,661
Chicago, Indianapolis & Louisville	654	1,131,611	351,117	1,482,728	246,361	385,312	31,216	660,979	62,506	2,099,285	81,836	90,618	-129,661
Chicago, Junction	12	206,021	111,917	317,938	139,322	26,301	1,706	83,372	4,727	135,466	4,596	91,531	2,545
Chicago, Milwaukee & St. Paul	10,629	11,740,913	3,133,574	14,874,487	2,839,956	3,673,174	166,526	7,335,748	455,211	14,397,957	652,656	1,106,171	-895,944
Chicago, Peoria & St. Louis	247	244,777	27,636	272,413	40,753	84,218	6,499	154,335	15,941	301,949	7,100	-19,733	30,708
Chicago, Rock Island & Pacific	7,662	8,519,318	3,433,100	11,952,418	2,908,000	2,881,601	181,207	5,813,638	307,416	11,624,456	476,083	1,265,947	-732,611
Chicago, St. Paul, Minn. & Omaha	1,749	1,961,117	795,061	2,756,178	400,468	523,417	51,198	1,270,466	83,427	2,643,112	137,705	491,786	53,276
Chicago, Terre Haute & Southeastern	374	623,215	25,658	648,873	100,198	90,544	5,048	246,958	12,089	547,354	19,500	146,343	108,920
Cincinnati, Indianapolis & Western	321	344,995	78,014	423,009	74,991	90,351	12,631	217,517	22,775	425,588	13,338	4,652	48,309
Cincinnati, Lebanon & Northern	76	120,254	10,162	130,416	34,131	16,010	3,060	72,415	2,878	128,494	6,810	-819	-11,375
Cincinnati, Northern	245	361,279	22,270	383,549	73,979	70,080	4,857	145,253	7,847	311,015	14,403	66,750	6,380
Cleveland, Cincinnati, Chic. & St. Louis	2,409	6,018,841	2,019,476	8,038,317	1,213,986	2,223,456	115,491	3,412,241	163,877	7,194,862	258,429	1,218,456	-927,246
Colorado & Wyoming	1,099	1,132,540	324,881	1,457,421	228,587	228,587	12,305	496,618	57,283	1,021,599	59,791	470,993	-247,434
Delaware & Hudson	43	30,789	1,254	32,043	22,304	17,849	220	48,468	4,236	53,079	5,000	4,322	-5,139
Delaware, Lackawanna & Western	881	4,178,721	542,556	4,721,277	455,470	1,082,680	34,795	1,853,580	185,492	3,648,716	81,500	1,299,944	1,062,581
Denver & Rio Grande	956	5,958,031	817,127	6,775,158	1,111,103	1,721,976	78,188	3,543,034	176,134	6,706,216	489,583	994,630	68,534
Denver & Salt Lake	2,585	2,937,135	837,307	3,774,442	4,058,873	525,813	71,162	1,306,018	87,432	2,819,606	135,000	1,103,861	153,778
Denver & Mackinac	255	227,954	38,890	266,844	58,726	56,900	1,612	119,053	7,524	243,815	5,000	40,731	87,572
Detroit, Grand Haven & Milwaukee	376	169,934	38,890	208,824	33,890	33,890	3,777	99,670	8,544	194,678	9,389	17,224	27,966
Detroit, Toledo & Ironton	195	556,600	52,564	609,164	104,290	80,345	6,723	263,146	14,661	470,105	180,648	177,600	40,927
Duluth & Iron Range	454	1,511,010	19,241	1,530,251	113,042	247,070	8,309	247,070	18,278	647,467	9,420	-92,628	-75,447
Duluth, Missabe & Northern	298	547,837	24,694	572,531	183,465	163,983	1,270	461,434	23,802	835,079	85,997	184,296	184,296
Duluth, South Shore & Atlantic	406	2,501,015	324,881	2,825,896	334,877	241,116	3,606	634,350	28,151	1,243,954	151,510	1,397,563	-596,335
Duluth, Winnipeg & Pacific	613	134,023	134,249	268,272	109,500	111,554	5,095	278,354	11,458	503,348	25,000	89,762	22,265
East St. Louis Connecting	178	157,308	33,221	190,529	36,857	44,131	3,987	97,407	8,145	190,522	11,207	-7,558	-11,245
El Paso & Southern	3	984,953	228,880	1,213,833	228,629	249,355	339	354,775	3,945	155,320	2,864	24,128	36,235
Elgin, Joliet & Eastern	1,027	2,279,679	324,881	2,604,560	285,994	396,711	25,346	865,642	50,319	917,598	100,415	269,676	-57,113
Erie	835	1,133,125	1,440,325	2,573,450	1,657,775	3,073,418	131,023	5,316,127	40,551	1,595,623	51,760	945,070	614,039
Florida East Coast	1,989	8,790,233	1,440,325	10,230,558	111,213	122,702	19,488	300,413	21,297	575,325	247,583	360,976	-380,535
Ft. Smith & Western	764	596,456	221,146	817,602	212,506	201,837	8,000	412,735	28,655	872,655	50,317	36,417	-28,664
Galveston Wharf	253	131,463	42,952	174,415	30,799	38,371	5,522	66,835	7,733	150,510	5,000	30,442	-5,446
Galveston, Harrisburg & San Antonio	13	1,908,725	495,539	2,404,264	46,196	6,259	644	47,064	2,733	140,807	17,000	59,294	82,733
Georgia	1,384	1,396,361	169,110	1,565,471	525,000	756,831	33,599	884,675	69,558	2,303,573	64,814	162,998	-12,551
Georgia	328	1,396,361	169,110	1,565,471	111,213	122,702	19,488	300,413	21,297	575,325	5,950	28,011	-110,666

REVENUES AND EXPENSES OF RAILWAYS.

NINE MONTHS OF CALENDAR YEAR 1920

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) in income last year.
		Freight.	Passenger.	Total (inc. misc.).	Way and structures.	Maintenance of equip-ment.	Traffic.	Trans- portation.	General.	Total.		
Alabama & Vicksburg	141	\$1,668,958	\$649,043	\$2,317,999	\$497,344	\$510,463	\$77,060	\$963,346	\$38,107	\$2,155,409	\$84,953	\$256,003
Ann Arbor	299	3,079,601	537,706	3,617,307	604,438	843,771	65,370	1,872,601	132,952	3,615,417	90,533	368,230
Archison, Topoka & Santa Fe	8,745	101,055,489	39,542,464	150,597,953	37,795,838	37,795,838	1,807,336	56,811,955	2,976,422	129,568,893	72,458	26,072,321
Atlanta & West Point	93	1,129,277	857,985	2,000,262	321,231	398,900	54,066	875,074	86,966	1,773,419	77,766	342,771
Atlanta, Birmingham & Atlantic	639	3,124,526	777,711	4,288,928	1,070,899	1,312,854	181,538	3,284,963	174,341	5,125,281	119,500	836,535
Atlantic City	177	997,773	2,640,796	3,638,569	549,312	415,948	4,531	2,062,290	13,278	3,065,885	80,199	758,915
Atlantic Coast Line	4,890	34,688,631	13,901,906	53,490,537	9,528,580	11,784,068	666,767	23,600,297	1,234,061	49,534,375	91,933	4,816,198
Baltimore & Ohio	5,153	126,522,201	22,450,910	162,573,871	24,010,184	50,733,967	1,999,604	81,746,148	4,426,983	164,152,772	100,938	1,376,038
Baltimore, Chesapeake & Atlantic	87	742,336	397,847	1,221,736	125,272	405,925	11,968	769,895	37,052	1,100,112	110,511	128,375
Bangor & Aroostook	658	3,648,975	789,485	4,778,375	1,125,065	1,150,894	36,161	1,854,358	172,679	4,400,198	92,227	369,267
Birmingham Southern	31	350,888	457,780	808,668	73,493	73,493	8,952	277,112	32,199	431,581	94,288	13,788
Beth Ky. Co. of Chicago	31	318,296	3,162,948	3,481,244	449,750	630,583	6,992	2,068,472	78,779	3,234,266	101,622	51,616
Bessemer & Lake Erie	225	9,845,875	377,337	10,223,212	1,247,889	3,175,987	126,380	3,066,127	266,134	8,498,205	80,900	1,867,942
Boston & Maine	2,294	38,007,395	18,320,360	63,009,153	10,793,392	14,024,972	485,497	37,269,787	2,214,391	63,133,952	103,377	4,318,852
Brooklyn Eastern District Terminal	9	762,055	839,121	1,601,176	128,832	269,652	1,260	572,622	38,866	1,011,332	120,511	172,111
Buffalo & Susquehanna, R. Corp.	296	2,072,258	62,848	2,135,106	483,931	474,282	23,119	819,576	33,550	2,304,842	109,900	215,559
Buffalo, Rochester & Pittsburgh	589	12,922,358	1,377,132	14,999,490	2,761,347	4,064,083	157,971	7,083,152	375,523	13,353,490	102,766	285,959
Canadian Pacific (Lines in Maine)	233	1,324,318	434,319	2,091,768	563,800	523,507	127,752	1,535,440	81,727	2,472,276	116,179	380,508
Carolina, Cincinnati & Ohio	291	4,802,812	390,341	5,335,509	709,075	1,274,670	145,110	1,707,481	183,884	6,108,419	75,311	1,317,090
Central New England	301	4,648,536	234,199	5,125,333	1,512,333	1,301,203	31,156	3,183,650	152,607	6,190,839	120,800	1,065,772
Central of Georgia	1,924	11,642,111	5,053,568	18,889,281	3,699,715	4,151,782	43,532	10,356,953	70,492	18,369,230	97,530	520,016
Central of New Jersey	684	25,905,711	7,430,296	33,336,007	5,698,777	12,263,362	203,848	19,536,371	650,387	36,821,980	107,733	2,798,353
Central Vermont	413	3,708,236	938,250	5,187,956	913,153	1,200,368	80,773	3,022,551	187,394	5,214,950	119,760	1,026,963
Charleston & Western Carolina	342	1,918,769	501,179	2,569,163	625,660	580,240	49,773	1,434,348	49,567	2,443,726	106,799	174,342
Chesapeake & Ohio	2,519	49,814,517	8,488,523	62,968,523	9,506,641	17,738,469	26,811,338	48,811,338	1,335,358	56,205,845	89,266	6,762,678
Chicago & Alton	1,050	14,422,944	5,113,131	19,536,075	3,357,135	5,920,125	330,976	10,039,833	570,930	20,439,573	94,724	1,134,126
Chicago & Eastern Illinois	1,131	15,291,899	3,979,117	19,271,016	3,083,915	7,127,252	234,706	10,039,833	570,930	20,439,573	94,724	1,134,126
Chicago, Detroit & Can. Grand Trk. Jct.	63	1,021,418	167,622	1,189,040	1,215,807	1,215,807	1,402	1,716,332	3,603	1,716,332	84,866	209,008
Chicago & Erie	269	7,468,968	697,913	8,991,129	1,109,075	1,613,856	137,818	4,820,290	368,791	8,010,563	93,134	974,565
Chicago & North Western	8,266	78,121,053	28,061,503	119,212,091	21,155,154	28,255,154	1,001,868	58,171,762	3,050,056	112,689,675	93,346	6,523,416
Chicago Great Western	1,496	11,317,969	4,241,350	17,527,303	4,891,507	4,891,507	335,121	8,381,127	280,830	11,266,434	108,100	1,407,032
Chicago, Indianapolis & Louisville	654	7,806,629	2,461,332	11,506,462	1,661,212	3,574,212	259,449	5,369,093	280,830	11,266,434	98,181	210,022
Chicago Junction	12	1,021,418	167,622	1,189,040	1,215,807	1,215,807	1,402	1,716,332	3,603	1,716,332	84,866	209,008
Chicago, Milwaukee & St. Paul	10,628	83,050,121	23,398,218	121,277,140	22,690,441	31,142,619	1,138,812	60,800,667	3,873,054	120,600,381	92,400	676,758
Cincinnati, Peoria & St. Louis	247	1,601,138	249,001	1,868,381	366,018	1,728,694	39,482	1,056,333	104,561	2,245,020	113,032	258,639
Cincinnati, Rock Island & Pacific	7,633	65,252,613	25,454,099	90,706,712	25,692,468	45,628,735	2,355,769	94,515,350	3,557,668	100,599,203	93,174	4,805,456
Cincinnati, St. Paul, Minn. & Omaha	1,749	14,551,262	6,189,610	20,740,872	4,536,390	261,681	261,681	11,031,005	2,355,769	23,398,203	99,140	2,409,661
Chicago, Terre Haute & Southeastern	374	3,794,257	223,415	4,017,672	355,557	1,446,767	42,578	1,770,314	101,830	4,033,150	97,644	97,453
Cincinnati, Indianapolis & Western	321	2,467,450	540,245	3,281,691	609,478	1,150,547	81,272	1,600,885	175,096	3,627,582	110,544	345,891
Cincinnati, Lebanon & Northern	76	749,518	82,944	899,051	195,839	1,97,389	17,753	633,191	23,061	1,067,233	118,771	168,182
Cincinnati, Northern	248	2,290,704	186,717	2,597,553	499,072	583,570	33,551	956,140	57,152	2,169,462	83,533	427,890
Cincinnati, Toledo, Chic. & St. Louis	2,408	43,239,161	14,649,110	64,450,863	8,804,756	15,385,755	894,892	27,478,029	1,303,420	54,375,739	84,377	10,075,104
Colorado & Wyoming	1,099	7,739,808	2,257,399	10,101,212	2,165,097	2,719,054	108,725	3,993,941	426,787	9,592,530	87,100	1,407,572
Colorado & Wyoming	43	196,979	8,762	205,741	137,704	171,470	2,492	381,871	37,583	731,120	100,112	851
Delaware & Hudson	881	26,796,967	2,841,815	31,515,408	3,649,448	8,994,914	264,650	15,482,397	1,345,721	29,979,045	95,133	1,536,363
Delaware, Lackawanna & Western	956	38,976,501	10,021,840	56,003,639	7,662,211	13,471,902	724,269	28,422,836	1,370,262	52,444,382	93,644	3,559,257
Denver & Rio Grande	2,585	20,043,273	5,732,791	25,776,064	4,580,078	6,845,998	349,575	10,284,246	738,827	23,398,203	83,466	4,636,163
Denver & Salt Lake	255	1,553,411	366,142	2,021,432	651,406	641,952	10,806	1,091,348	71,460	2,466,972	122,044	445,540
Detroit & Mackinac	376	1,017,483	329,425	1,476,074	276,953	404,054	25,043	743,526	69,891	1,518,518	102,888	42,443
Detroit, Grand Haven & Milwaukee	195	2,717,112	421,812	3,563,608	629,369	755,240	55,825	2,212,810	120,554	3,776,730	105,988	23,121
Detroit, Toledo & Ironton	454	3,256,618	139,775	3,632,854	1,224,688	855,854	58,840	1,949,431	171,614	4,277,916	117,766	647,063
Duluth & Iron Range	298	7,784,533	212,686	8,650,127	1,116,411	1,116,411	9,240	2,195,235	171,210	4,603,033	53,211	4,047,124
Duluth, Missabe & Northern	406	13,236,272	459,965	14,931,220	1,932,848	1,932,848	26,761	3,227,140	199,927	6,897,273	46,000	8,096,447
Duluth, South Shore & Atlantic	613	2,761,312	991,181	4,203,025	907,826	750,516	47,204	2,108,187	105,405	3,977,547	94,644	225,478
Duluth, Winnipeg & Pacific	178	1,469,211	253,497	1,763,403	327,318	356,536	32,364	849,407	77,999	1,643,624	93,211	119,779
East St. Louis Connecting	3	1,044,737	135,762	1,224,688	287,933	287,933	2,728	820,453	35,567	1,261,543	122,677	258,806
El Paso & Southwestern Co.	1,027	7,905,064	1,927,232	10,550,137	2,359,637	2,154,164	1,718	3,014,270	384,164	8,151,566	77,266	2,398,571
Elgin, Joliet & Eastern	833	15,327,075	90	17,470,101	1,931,429	4,131,429	7,295,316	3,158,069	33,989	13,758,069	78,775	3,712,036
Erie	1,989	57,867,274	10,514,931	76,084,974	12,011,305	27,015,159	706,239	42,106,204	2,370,491	85,043,733	111,777	8,958,759
Gulf Coast Lines	920	6,425,211	2,425,094	9,416,899	1,687,649	2,359,963	198,281	3,227,128	372,236	7,936,525	84,288	1,480,374
Florida East Coast	764	5,520,100	2,934,252	8,454,352	1,744,162	2,359,963	79,990	3,858,999	238,311	7,453,676	76,344	2,427,571
Ft. Smith & Western	253	949,248	301,064	1,348,400	311,482	326,694	39,961	558,628	69,162	1,317,014	97,667	31,386
Galveston Wharf	13	.....	.....	1,227,505	414,846	39,271	3,965	363,954	22,466	1,052,299	85,733	175,506

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Net from railway operation.	Operating income (or loss).	Increase (or decr.) income comp. with last year.
		Freight.	Passenger.	Total.	Way and structures.	Traffic.	Trans- portation.			
Georgia & Florida	405	\$114,402	\$32,650	\$157,558	\$36,487	\$21,147	\$93,722	\$8,946	\$167,065	\$16,689
Grand Trunk Western	350	1,245,078	302,852	1,547,930	306,654	20,717	1,320,559	48,999	1,389,076	51,084
Great Northern	166	192,664	67,007	259,671	103,811	74,320	173,461	11,181	184,642	17,722
Great Northern	8,171	9,936,339	2,160,081	12,096,420	2,101,738	1,832,905	11,172	169,006	9,055,606	945,869
Gulf & Ship Island	307	227,919	60,476	288,395	62,891	63,470	110,828	13,993	254,402	21,947
Gulf Coast Lines	923	978,668	335,760	1,314,428	214,347	203,174	400,571	46,068	889,550	28,417
Gulf, Colorado & Santa Fe	1,507	1,918,882	609,473	2,528,355	689,280	57,611	977,773	60,062	2,468,281	37,812
Gulf, Mobile & Northern	470	339,495	63,854	403,349	88,265	95,344	183,177	19,600	203,749	14,175
Houston & Texas Central	915	748,791	274,766	1,023,557	275,000	287,986	408,314	31,814	1,018,660	51,380
Houston East & West Texas	190	179,775	60,124	239,899	97,500	53,768	103,563	7,517	265,388	7,786
Illinois Central	4,799	10,752,459	2,526,048	14,120,780	2,282,659	3,164,442	5,666,664	290,253	11,616,070	704,623
Illinois Terminal	1,920	109,752	.....	109,752	10,447	11,917	26,376	3,502	55,059	1,117
Indiana Harbor Belt	120	1,286,938	407,548	1,694,486	118,861	286,391	622,956	29,422	1,059,366	10,686
International & Great Northern	1,159	1,286,938	407,548	1,694,486	266,596	412,835	841,296	54,431	1,610,663	30,000
International Ry. of Maine	233	123,282	37,806	161,088	120,443	40,494	103,354	3,573	270,971	12,200
Kanawha & Michigan	176	474,365	69,526	543,891	96,311	168,454	182,473	14,503	465,613	33,813
Kansas City, Mexico & Orient	272	127,162	21,984	149,146	48,784	5,298	121,064	2,799	146,347	59,634
Kansas City, Mexico & Orient of Texas	465	162,095	27,385	189,480	93,251	14,259	95,230	3,953	175,231	7,760
Kansas City Southern	779	1,745,223	282,977	2,028,200	204,817	318,080	784,076	68,753	1,249,908	6,250
Kansas, Oklahoma & Gulf	329	240,222	29,387	269,609	55,357	32,316	115,517	10,207	245,696	73,500
Lake Erie & Western	741	1,181,773	75,558	1,257,331	143,191	343,307	461,038	28,584	988,175	43,738
Lake Erie & Western	12	340,114	5,100	345,214	21,531	1,374	172,297	278	223,917	103,35
Lehigh & Hudson River	92	340,114	5,100	345,214	21,531	1,374	172,297	278	223,917	103,35
Lehigh & New England	229	340,114	5,100	345,214	21,531	1,374	172,297	278	223,917	103,35
Lehigh Valley	1,435	5,735,999	852,151	6,588,150	911,176	2,071,067	3,266,613	150,536	6,519,969	92,47
Long Island	398	786,102	1,287,845	2,073,947	404,308	436,625	1,940,315	64,684	2,138,532	77,84
Los Angeles & Salt Lake	1,646	1,138,322	522,008	1,660,330	296,371	354,034	662,537	40,594	1,313,736	382,569
Louisiana	402	335,546	282,893	618,439	381,453	5,014	131,736	12,772	300,455	78,77
Louisiana Ry. & Navigation Co.	343	257,422	42,705	300,127	72,567	5,311	116,669	11,812	312,500	19,456
Louisiana Western	207	322,216	121,961	444,177	122,500	106,424	119,212	15,391	372,713	79,60
Louisville & Nashville	5,040	8,562,504	2,723,838	11,286,342	2,896,412	2,896,412	5,024,535	261,702	10,578,050	88,55
Louisville, Henderson & St. Louis	199	198,212	62,175	260,387	46,060	34,558	77,139	9,077	234,243	79,79
Maine Central	1,216	1,427,138	643,832	2,070,970	379,200	20,256	38,133	1,082	2,031,768	118,27
Maryland, Delaware & Virginia	83	90,810	64,340	155,150	12,039	10,138	86,664	3,572	113,813	71,51
Michigan Central	1,862	6,135,612	2,206,398	8,342,010	1,166,894	2,054,171	3,307,297	133,154	6,884,290	76,28
Midland Valley	388	396,251	114,897	511,148	101,433	73,183	157,181	16,007	351,250	66,34
Minneapolis & St. Louis	1,646	1,436,530	254,961	1,691,491	329,552	25,132	725,309	45,938	1,401,857	79,27
Mineral Range	101	59,931	62,532	122,463	20,256	38,133	38,133	1,082	73,953	118,27
Mississippi	4,243	3,688,883	927,429	4,616,312	898,157	97,378	2,009,244	110,739	4,072,424	311,409
Mississippi, St. Paul & Sault Ste. Marie	194	76,688	34,615	111,303	29,132	21,747	55,932	4,004	111,434	8,438
Missouri	164	89,120	23,416	112,536	27,451	26,381	42,539	8,417	107,636	90,39
Missouri, North Arkansas	364	128,091	59,475	187,566	46,289	34,558	77,139	9,214	170,716	85,47
Missouri, Kansas & Texas	1,715	2,491,011	1,020,493	3,511,504	592,103	860,765	1,301,896	118,875	2,929,978	79,77
Missouri, Kansas & Texas of Texas	1,739	1,604,833	924,111	2,528,944	556,240	461,016	1,064,496	88,323	2,226,971	81,70
Missouri Pacific	7,299	7,956,676	2,121,908	10,078,584	2,652,917	2,519,408	4,657,417	286,699	9,710,723	88,86
Mobile & Ohio	1,165	1,481,041	236,995	1,718,036	260,933	513,863	813,872	52,960	1,680,954	51,152
Monongahela	107	460,041	35,226	495,267	145,955	84,799	141,388	7,163	352,000	69,34
Monongahela Connecting	7	.....	.....	.....	56,480	34,292	203,273	7,196	301,836	103,81
Nashville, Chattanooga & St. Louis	1,247	1,559,275	544,705	2,103,980	525,416	490,216	1,012,786	57,614	2,155,946	93,20
Nevada Northern	165	61,941	11,152	73,093	26,995	8,991	23,893	4,246	64,780	10,299
New Jersey & New York	48	18,043	111,203	129,246	13,332	5,568	74,089	4,222	99,879	74,68
New Orleans Great Northern	284	197,510	55,982	253,492	35,103	55,763	120,814	11,544	170,716	85,47
New York Central	6,069	24,266,867	10,608,130	34,874,997	8,440,318	287,466	17,623,370	835,073	31,978,995	83,73
New York, Chicago & St. Louis	5,4	2,826,291	135,192	3,030,078	438,853	381,379	1,429,877	89,716	2,648,261	101,360
New York, New Haven & Hartford	2,007	5,895,969	5,490,669	11,386,638	2,781,375	44,212	5,676,858	350,327	10,948,420	88,10
New York, Ontario & Western	569	747,641	324,897	1,072,538	145,846	323,438	548,923	31,704	1,064,312	86,58
New York, Philadelphia & Norfolk	121	563,865	120,670	684,535	188,578	10,565	723,056	22,492	399,909	96,98
New York, Susquehanna & Western	135	314,046	77,863	391,909	131,189	66,329	354,984	15,124	572,675	131,73
Newburgh & South Shore	7	.....	.....	.....	18,112	32,568	102,072	4,671	157,423	82,77
Norfolk & Western	2,198	7,577,907	1,064,419	8,642,326	1,139,136	85,841	3,744,041	127,720	7,635,788	85,22
Norfolk Southern	944	453,627	204,830	658,457	145,207	136,737	395,944	31,092	730,126	104,21
Northern Pacific	6,655	8,310,912	2,261,170	10,572,082	2,156,960	1,141,803	4,143,454	279,617	8,966,297	77,50
Northern Pacific	536	504,196	276,714	780,910	141,518	88,467	317,736	15,180	572,199	66,29
Oahu Ry. & Land Co.	114	166,033	41,787	207,820	26,975	19,094	60,008	12,825	119,174	52,81

REVENUES AND EXPENSES OF RAILWAYS.

NINE MONTHS OF CALENDAR YEAR 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating income (or loss).	Railway tax accruals.	Net from railway operation.	Increase (or decr.) income last year.
		Freight.	Passenger.	Total.	Maintenance of way and structures.	Equip- ment.	Traffic.				
Galveston, Harrisburg & San Antonio...	1,383	\$12,645.102	\$4,196.415	\$18,277.168	\$3,001.352	\$4,865.626	\$327.639	\$7,280.629	\$628.057	\$17,224.254	\$2,229.772
Georgia & Florida...	328	5,175.594	1,323.806	6,499.400	790.979	1,208.927	130.933	2,708.931	100.24	\$1,052.409	\$2,229.772
Grand Trunk Railway Co. of Canada...	105	1,716.080	340.694	2,056.774	569.699	297.727	26,190	1,490.837	65.436	1,864.341	859.404
Grand Trunk Western...	350	9,956.995	2,080.036	12,637.031	1,797.282	3,180.772	188,356	5,826.790	888.203	1,149,574	163,074
Great Northern...	8,175	61,809.921	15,266.554	88,777.113	20,794.405	18,715.123	848,492	38,536.548	711,770	6,599,791	1,517,254
Gulf & Ship Island...	1,403	1,508.908	473.527	1,982.435	673.938	1,308.497	55,378	953.777	726,252	1,231,447	11,107,859
Gulf, Colorado & Santa Fe...	1,914	12,736.003	4,734.572	17,470.575	1,208.983	1,743.348	248,762	9,134,700	1,438.645	1,780,945	282,304
Gulf, Mobile & Northern...	1,200	2,088.394	426.352	2,514.746	1,120.602	729.899	100,498	1,358.991	122,227	656,119	2,807,187
Houston & Texas Central...	895	5,300.158	2,201.372	7,501.530	2,001.000	1,850.479	138,090	3,576,967	445,422	225,252	957,319
Houston East & West Texas...	1,900	1,463,514	500.279	2,117,493	363,349	776,977	28,799	992,214	78,812	1,048.88	489,852
Illinois Central...	4,799	74,731,137	19,536,186	104,035,566	20,244,109	27,830,755	943,356	46,615,656	5,038,570	5,860,227	4,623,978
Indiana Harbor Belt...	1,403	7,347,713	1,772,351	9,120,064	44,457	194,934	7,055	194,934	10,215	3,377,728	1,963
International & Great Northern...	1,159	4,428,624	2,662,722	7,091,346	1,013,995	2,273,208	24,943	4,814,641	131,09	1,970,234	1,718,780
International Ry. Co. of Maine...	233	1,524,525	454,319	2,091,768	563,800	523,507	27,731	1,325,440	118,19	380,508	169,000
Kanawha & Michigan...	176	3,094,644	490,390	3,585,034	773,270	1,435,341	30,052	1,507,656	103,57	1,332,622	275,998
Kansas City, Mexico & Orient...	270	943,201	172,683	1,115,884	441,744	444,438	34,572	743,443	148,23	378,321	647,685
Kansas City, Mexico & Orient of Texas...	465	1,038,334	210,388	1,248,722	678,971	424,979	34,355	833,587	153,41	213,896	57,094
Kansas City Southern...	779	10,689,598	2,247,706	14,004,144	2,044,475	2,985,569	305,249	5,886,336	83,83	2,274,098	1,655,157
Kansas, Oklahoma & Gulf...	329	1,537,596	221,280	1,854,117	452,030	506,620	22,016	965,171	109,64	1,787,881	272,536
Lake Erie & Western...	741	7,371,883	613,615	8,477,993	1,158,706	2,925,536	140,171	3,807,345	97,55	207,624	365,269
Lehigh & Hudson River...	12	1,974,621	36,815	2,011,436	275,225	235,066	16,665	1,168,323	112,61	124,980	52,632
Lehigh & New England...	229	3,080,843	18,010	3,229,689	578,334	734,885	52,108	1,282,772	85,70	1,31,335	77,751
Lehigh Valley...	1,435	41,691,559	5,785,499	51,716,966	9,371,809	16,315,458	625,190	30,058,406	111,88	6,106,623	1,811,000
Los Angeles & Salt Lake...	398	5,002,101	12,482,302	19,479,399	2,974,339	3,878,339	156,941	10,790,362	531,41	18,571,957	929,066
Los Angeles & San Joaquin...	1,168	9,169,138	4,379,168	14,941,340	2,033,438	2,858,586	258,731	3,428,668	76,24	3,555,285	757,236
Louisiana & Arkansas...	302	2,479,320	453,819	3,062,944	689,648	494,089	43,254	1,065,761	77,39	738,193	157,642
Louisiana Ry. & Navigation...	343	2,467,009	390,441	3,047,394	747,621	500,971	58,110	1,376,933	91,40	262,012	126,000
Louisiana Western...	207	2,610,871	993,135	3,870,363	944,976	707,062	64,307	1,031,880	75,04	966,167	315,557
Louisville & Nashville...	5,040	65,445,832	19,578,267	92,043,833	17,170,622	25,592,535	1,516,076	42,815,771	89,52	2,284,322	2,666,716
Louisville, Henderson & St. Louis...	199	1,550,325	569,852	2,297,845	582,217	329,897	49,536	841,403	95,56	414,465	375,470
Maine Central...	1,216	9,696,869	4,024,715	14,980,682	2,959,273	3,675,538	124,662	9,141,473	109,27	1,389,097	841,166
Maryland, Delaware & Virginia...	83	578,011	362,678	987,316	97,603	363,228	8,550	693,985	190,11	2,00,378	216,432
Michigan Central...	1,862	39,603,683	16,971,256	63,584,316	9,119,718	17,042,539	732,468	28,018,879	89,92	6,406,234	4,418,843
Midland Valley...	388	2,468,831	915,878	3,549,589	915,722	653,411	31,848	1,352,655	87,59	440,555	375,470
Mineral Range...	101	474,857	2,715	96,576	172,043	180,853	2,704	293,360	127,82	1,38,134	34,800
Minneapolis & St. Louis...	1,646	9,290,107	2,046,194	12,082,375	2,330,350	3,192,837	176,527	6,501,123	106,11	738,187	1,268,639
Minneapolis, St. Paul & Sault Ste. Marie...	4,243	23,899,324	6,770,655	33,974,903	6,732,294	6,994,258	369,117	15,641,790	91,04	3,042,755	2,557,777
Minnesota & International...	194	610,257	274,461	950,910	258,412	184,287	5,245	479,632	101,27	12,114	50,056
Mississippi Central...	164	519,357	202,581	777,163	344,653	299,342	21,816	392,664	175,38	359,211	40,054
Missouri & North Arkansas...	364	914,370	438,227	1,488,593	557,496	334,831	30,919	684,840	113,21	196,648	43,034
Missouri, Kansas & Texas...	1,715	19,838,637	6,837,323	28,980,943	5,632,674	8,085,672	949,137	10,501,041	87,01	3,242,432	1,046,345
Missouri, Kansas & Texas of Texas...	1,752	11,796,026	6,837,723	20,620,665	5,828,474	4,273,853	296,137	11,173,893	109,57	1,973,880	501,144
Missouri Pacific...	7,299	59,759,399	16,213,652	83,944,497	19,365,604	21,944,010	1,314,127	37,309,642	98,60	1,176,734	3,300,406
Monongahela...	1,115	10,760,960	1,790,636	13,556,041	2,905,471	4,380,101	295,476	6,656,747	108,34	1,131,327	532,570
Monongahela Connecting...	107	2,596,714	214,380	2,914,504	1,059,169	530,965	8,746	1,095,793	94,92	148,061	54,051
Nashville, Chattanooga & St. Louis...	1,247	12,417,802	4,094,462	18,108,594	3,826,993	4,894,619	509,408	8,252,735	99,67	59,832	414,500
Nevada Northern...	165	1,202,617	93,038	1,351,611	265,556	226,171	7,777	352,418	66,35	454,805	91,197
New Jersey & New York...	47	123,086	779,365	969,082	111,155	165,118	13,396	914,050	94,32	55,032	19,218
New Orleans Great Northern...	284	1,411,362	465,327	1,967,063	487,415	439,960	41,406	842,282	97,03	58,431	107,612
New York, Philadelphia & Norfolk...	6,069	153,619,497	72,082,926	204,826,726	40,181,046	73,566,265	2,587,966	129,892,870	6,289,124	27,505,311	9,500,268
New York Central...	574	18,796,087	961,608	20,486,720	2,459,927	3,613,301	400,979	8,750,142	77,63	4,582,465	735,000
New York, New Haven & Hartford...	1,980	39,917,377	38,273,263	90,700,127	15,560,752	22,323,364	510,723	48,464,134	101,20	1,092,546	3,365,535
New York, Ontario & Western...	569	5,304,819	2,670,742	7,944,674	1,835,471	2,121,948	102,530	4,660,924	98,06	183,390	288,483
New York, Philadelphia & Norfolk...	121	4,465,988	962,442	5,428,430	624,330	1,710,918	89,167	3,631,266	106,36	379,683	277,272
New York, Susquehanna & Western...	135	2,377,508	582,118	3,250,806	556,530	717,456	27,515	2,443,849	118,09	585,792	773,139
Newburgh & South Shore...	7	1,258,412	149,879	297,828	149,879	297,828	.....	8,627	104,43	55,693	77,348
Norfolk & Western...	2,200	48,956,241	7,359,762	59,683,436	9,731,710	21,631,599	545,449	27,308,583	101,81	1,078,533	3,470,000
Norfolk Southern...	922	3,875,298	1,533,711	5,409,009	1,417,772	1,262,595	133,419	3,115,647	106,17	360,692	173,416
Northwestern Pacific...	6,652	55,296,544	16,099,730	79,616,516	16,838,028	16,411,697	755,248	32,155,646	88,27	9,340,721	6,952,979
Northwestern Pacific...	537	3,069,056	2,148,069	5,919,357	1,088,892	729,285	53,936	2,482,196	76,36	1,399,160	251,762

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of way and structures.	Equip-ment.	Traffic.	Trans-portion.				
Fanhandle & Santa Fe.....	857	\$724,805	\$196,523	\$921,328	\$247,384	\$336,268	\$4,712	\$310,748	95.50	\$43,273	\$25,454	—\$47,930
Pennsylvania R. R. Co.....	7,259	40,024,384	13,889,096	53,913,480	8,598,840	15,108,025	506,367	25,923,901	89.20	6,320,148	1,664,512	931,690
Peoria & Pekin Union.....	19	29,156	4,647	33,803	23,020	38,675	92,517	160,079	120.05	—26,734	9,500	41,394
Pere Marquette.....	2,239	3,380,364	726,043	4,106,407	652,164	907,848	45,680	1,812,849	81.49	865,297	66,303	—149,806
Philadelphia, Bethlehem & New England.....	10	.....	.....	146,577	14,184	14,569	453	89,405	81.49	26,635	1,335	29,908
Perkerson.....	41	116,117	15,030	131,147	11,335	5,198	76	42,458	44.24	74,855	—1,277	28,075
Pittsburgh & Reading.....	1,126	7,076,076	921,795	7,997,871	1,039,005	2,113,107	64,823	3,886,143	85.50	1,208,376	244,005	964,085
Pittsburgh & Lake Erie.....	224	3,405,375	336,155	3,741,530	4,253,041	765,927	19,794	1,339,147	87.46	182,865	182,865	74,345
Pittsburgh & Shawmut.....	103	156,875	3,746	160,621	38,951	40,729	2,223	58,885	78.41	42,397	174	37,203
Pittsburgh & West Virginia.....	63	270,165	11,454	281,619	184,466	95,724	2,075	88,914	79.45	63,461	13,274	96,569
Pittsburgh, Cincinnati, Chic. & St. Louis.....	2,383	6,954,575	2,063,928	9,018,503	1,559,838	2,985,457	92,133	4,692,653	98.82	115,004	321,127	844,682
Port Reading.....	209	174,375	7,445	181,820	184,308	36,690	1,404	71,699	92.89	13,034	1,957	38,418
Port Richmond & Potomac.....	21	187,138	.....	187,138	221,634	19,965	18	92,988	56.11	97,276	9,868	2,003
Richmond, Fredericksburg & Potomac.....	117	477,495	376,179	853,674	159,793	193,336	9,078	499,900	95.78	40,204	31,918	8,285
Rutland.....	415	356,590	196,931	553,521	649,389	104,750	7,881	248,294	80.40	127,296	22,888	62,492
St. Louis Merchants Bridge Terminal.....	9	.....	.....	481,970	71,197	73,952	978	252,817	84.59	74,283	11,949	28,048
St. Louis-San Francisco.....	4,757	6,442,308	2,589,544	9,031,852	1,392,657	1,908,964	63,638	3,325,242	73.07	2,550,370	2,592,083	231,995
South Buffalo.....	11	100,595	.....	100,595	161,117	8,155	22,559	15,353	115.32	—24,206	3,750	—27,956
St. Louis Southwestern.....	968	1,779,209	241,009	2,020,218	318,600	325,483	50,895	551,200	62.30	797,944	77,415	357,556
St. Louis Transfer Co.....	6	.....	.....	135,645	10,227	17,323	230	55,693	63.60	49,371	273	49,099
San Antonio & Aransas Pass.....	736	589,265	181,609	770,874	99,937	118,781	9,228	246,722	61.18	314,325	13,750	339,095
San Antonio, Uvalde & Gulf.....	317	89,489	153,695	243,184	25,953	27,810	2,243	76,588	84.41	23,957	2,294	37,617
Seaboard Air Line.....	3,563	7,622,849	1,007,672	8,630,521	482,039	766,283	100,891	1,936,696	83.41	693,127	135,000	597,105
Southern Railway.....	6,971	8,583,185	3,700,528	12,283,713	2,336,409	2,748,574	211,095	6,255,205	89.40	1,428,174	531,991	21,890
Alabama Great Southern.....	313	777,461	250,922	1,028,383	144,585	202,668	21,803	445,249	78.71	230,323	71,418	54,515
Cinn., New Orleans & Texas Pacific.....	338	1,584,538	423,517	2,008,055	206,829	507,961	29,149	733,517	72.93	568,483	107,122	720,661
Georgia Southern & Florida.....	402	274,044	114,253	388,297	126,968	102,099	9,704	254,223	118.36	78,867	22,086	—87,819
New Orleans & Northeastern.....	207	541,767	127,825	669,592	145,237	152,009	12,316	329,316	88.24	88,402	41,416	132,146
Northern Alabama.....	110	88,533	18,331	106,864	33,650	5,584	1,933	52,835	91.82	8,973	5,363	6,951
Southern Ry. in Mississippi.....	278	990,568	51,681	1,042,249	59,533	32,943	2,603	86,691	121.92	—33,854	9,800	—44,080
Southern Pacific Co. Pacific System.....	7,105	13,706,429	5,202,888	18,909,317	2,338,250	3,125,000	221,030	7,611,039	69.06	6,320,862	916,944	733,429
Southern Pacific S. S. Lines.....	165	623,539	95,420	718,959	117,871	117,871	15,650	67,056	126.01	—186,790	11,523	—52,827
Spokane, Portland & Seattle.....	549	590,438	237,483	827,921	28,306	114,387	7,693	57,226	66.85	318,596	96,995	33,457
Staten Island Rapid Transit.....	23	84,753	113,224	197,977	79,011	27,719	1,679	136,659	112.34	—28,764	15,000	—44,256
Tennessee Central.....	292	184,979	72,542	257,521	63,304	37,874	4,705	136,202	100.75	—5,037	5,714	27,525
Terminal R. R. Assn. of St. Louis.....	36	.....	.....	475,773	89,863	71,718	1,029	352,821	74.16	122,951	40,747	395
Texas & New Orleans.....	469	165,804	24,819	190,623	18,122	32,567	3,595	66,310	61.86	78,616	69,818	26,978
Texas & Pacific.....	1,946	2,371,889	1,056,266	3,428,155	290,000	291,692	9,446	325,681	110.96	—96,633	26,032	—168,878
Toledo & Ohio Central.....	503	1,284,608	87,649	1,372,257	656,258	742,552	43,508	1,607,761	87.22	468,409	89,150	—278,211
Toledo, Peoria & Western.....	247	92,328	47,240	139,568	143,267	334,860	12,123	544,316	73.83	377,297	45,179	199,437
Toledo, St. Louis & Western.....	454	1,029,280	42,667	1,071,947	332,348	197,510	2,212	92,268	104.12	—6,453	8,500	—3,435
Trinity & Brazos Valley.....	368	170,566	212,328	382,894	47,633	70,180	17,210	412,482	87.97	133,336	31,000	—4,705
Ulster & Delaware.....	128	70,979	82,746	153,725	29,502	22,785	2,748	102,433	94.98	8,854	5,006	35,889
Union R. R. (of Pa.).....	45	1,271,196	106,410	1,377,606	267,864	267,864	282	632,001	79.88	255,751	12,918	187,595
Union Pacific.....	3,614	11,264,475	2,241,552	13,506,027	1,753,098	2,370,171	95,885	3,913,427	60.46	5,702,997	868,838	179,808
Utah.....	98	182,428	732	183,160	26,490	33,322	337	38,150	55.72	102,533	10,933	22,570
Vicksburg, Shreveport & Pacific.....	171	339,692	101,064	440,756	105,531	101,402	9,128	177,725	82.82	56,983	14,036	—20,002
Virginian.....	523	1,782,977	83,784	1,866,761	203,583	325,963	11,704	560,824	56.32	877,882	814,416	343,217
Wabash.....	2,472	4,787,652	1,152,976	5,940,628	988,477	1,277,998	123,240	2,749,506	84.90	955,488	132,181	823,069
West Jersey & Seashore.....	361	419,215	961,500	1,380,715	305,350	292,111	14,355	713,295	91.80	121,571	37,097	337,599
Western Maryland.....	797	1,952,667	128,939	2,081,606	218,230	481,206	34,950	1,742,820	79.61	446,411	55,000	26,232
Western Pacific.....	1,011	1,493,631	285,375	1,779,006	332,659	261,147	1,851,407	660,401	73.86	484,099	66,815	—135,513
Western Ry. of Alabama.....	133	142,777	92,213	234,990	47,147	49,485	6,754	86,397	79.22	203,022	7,175	7,699
Wheeling & Lake Erie.....	511	1,764,713	87,755	1,852,468	312,976	397,523	14,701	750,072	75.26	499,502	80,913	317,668
Wichita Falls & Northern.....	328	149,293	38,933	188,226	874	98,266	874	98,266	69.78	24,726	13,967	31,898
Yazoo & Mississippi Valley.....	1,381	1,541,123	116,963	1,658,086	216,055	27,203	892,019	66,750	93.82	135,513	91,880	—611,709

REVENUES AND EXPENSES OF RAILWAYS.

NINE MONTHS OF CALENDAR YEAR 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues—Total			Operating expenses—			Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) last year.
		Freight.	Passenger.	(Inc. misc.)	Maintenance of way and structures.	Equipment.	Traffic.					
Oahu Railway & Land.	114	\$1,128,904	\$368,695	\$1,620,369	\$210,348	\$258,819	\$8,448	\$479,706	\$86,311	\$936,745	\$57,81	\$112,648
Panhandle & Santa Fe.	801	4,804,391	1,469,209	6,709,893	1,767,507	2,308,084	43,045	2,947,187	162,436	7,221,262	107,62	361,787
Pennsylvania R. Co.	7,259	259,713,952	98,110,412	395,552,443	70,750,391	130,921,464	3,614,747	211,534,097	10,531,670	434,589,627	109,87	77,901,592
Peoria & Pekin Union.	19	242,690	37,039	1,140,298	166,712	335,028	2,038	813,077	44,540	1,361,396	119,39	158,897
Pere Marquette.	2,233	21,050,231	5,371,993	29,455,822	4,316,398	6,992,010	377,222	13,899,802	986,886	26,653,430	90,18	3,498,923
Philadelphia, Bethlehem & New England	10	755,705	100,948	888,181	141,039	143,521	4,056	695,945	13,767	998,328	101,03	34,181
Pickens.	41	52,030,737	8,202,757	64,283,950	8,857,373	40,999	512,745	371,367	2,622	501,223	55,37	38,641
Pittsburgh & Lake Erie.	224	18,598,453	2,380,212	22,975,723	2,977,746	9,549,757	168,736	20,511,634	1,534,356	63,803,522	165,72	5,840,952
Pittsburgh & Shawmut.	103	1,175,501	46,912	1,233,874	274,695	330,731	13,566	9,251,961	557,610	24,466,214	1,251,49	5,967,791
Pittsburgh & West Virginia.	63	1,446,798	88,963	1,718,601	575,757	472,801	14,808	663,486	84,070	1,910,229	111,15	244,017
Pittsburgh, Cincinnati, Chic. & St. Louis	2,383	48,726,650	16,937,789	75,475,122	12,992,080	26,890,958	860,700	40,407,951	2,144,182	84,028,243	111,33	14,699,143
Port Reading.	209	1,018,957	58,623	1,103,816	282,440	512,306	16,103	563,509	72,171	1,446,571	131,05	342,755
Port Reading & Potomac.	21	1,043,408	1,333,509	174,073	87,613	170	785,429	15,126	1,062,411	73,496	197,602	42,590
Richmond, Fredericksburg & Potomac.	117	3,951,971	2,802,722	8,286,833	837,727	1,374,815	65,824	3,479,991	244,336	6,107,342	73,70	2,076,317
Rutland.	415	1,896,385	995,706	3,480,388	730,297	1,007,899	39,920	1,698,532	101,874	3,592,709	103,23	314,350
St. Louis, Brownsville & Mexico.	548	3,399,310	1,740,911	5,540,616	1,263,743	1,025,005	116,773	1,992,984	228,341	4,618,872	83,36	352,164
St. Louis Merchants Bridge Terminal.	9	2,889	3,014,210	48,765,782	7,936	2,221,751	7,936	2,221,751	79,650	3,451,776	114,92	144,761
St. Louis-San Francisco.	4,757	44,800,951	18,764,317	67,498,809	12,219,069	15,915,189	616,673	28,393,421	2,990,227	59,083,660	87,53	4,949,276
South Buffalo.	11	530,812	1,084,767	62,957	141,471	4,502	775,829	18,579	1,003,339	81,428	35,750	2,681
St. Louis Southwestern.	962	12,958,028	1,726,189	15,460,998	2,186,397	2,622,983	381,124	4,230,679	443,489	9,918,439	64,15	3,045,669
St. Louis Transfer.	6	2,647,995	1,033,647	4,039,867	969,824	96,446	6,076	2,093,102	180,316	4,299,679	79,19	5,414
San Antonio & Aransas Pass.	736	706,795	323,437	1,145,779	312,108	214,500	20,403	638,683	53,786	1,239,480	106,43	377,344
Seaboard Air Line.	3,563	23,744,862	7,878,635	36,094,624	6,911,405	9,342,879	928,424	18,871,749	1,481,089	37,907,993	108,18	41,235
Southern Ry.	6,973	73,056,069	27,472,420	112,411,915	15,211,058	21,501,229	1,516,526	50,972,246	2,937,283	93,232,120	82,94	7,313,676
Alabama Great Southern.	313	5,979,635	1,843,479	8,446,324	896,697	1,832,615	167,501	3,205,767	214,342	6,384,131	75,58	793,016
Cinn., New Orleans & Texas Pacific.	338	11,137,964	3,090,628	15,331,455	1,668,102	3,847,508	239,144	5,610,901	351,001	11,815,762	77,07	2,970,081
Georgia Southern & Florida.	402	2,387,991	1,120,203	3,917,979	637,143	930,219	68,310	2,032,569	111,475	3,801,706	116,27	162,040
New Orleans & Northeastern.	207	4,173,477	978,986	5,772,236	913,242	1,126,926	97,386	2,399,108	160,072	4,740,041	83,12	500,330
Northern Alabama.	110	915,668	138,230	1,105,093	280,017	66,571	14,535	528,069	25,944	915,136	82,81	133,599
Southern Mississippi.	278	744,111	430,264	1,274,865	560,120	237,672	26,327	804,448	55,169	1,683,737	126,80	444,088
Southern Pacific Co. Pacific System.	7,097	89,245,125	40,492,432	145,540,367	21,293,908	30,339,496	1,591,590	58,681,456	3,718,919	120,168,849	83,08	4,779,903
Southern Pacific Steamship Lines.	161	930,935	174,317	1,140,196	201,363	92,890	22,350	352,863	47,694	720,058	63,15	156,131
Spokane International.	549	4,377,496	1,753,345	6,666,525	1,503,567	898,156	69,427	2,280,139	222,789	5,063,664	75,96	392,084
Spokane, Portland & Seattle.	23	699,984	885,374	1,765,448	418,338	305,662	13,021	1,057,789	98,952	1,893,761	107,27	40,612
Staten Island Rapid Transit.	292	1,516,514	481,910	2,157,998	417,562	445,706	42,805	1,092,327	94,649	2,092,869	97,00	318,412
Tennessee Central.	36	8,480	3,383,618	714,628	166,977	9,202	1,627,120	79,939	3,088,066	337,358	41,959	133,543
Terminal R. R. Association of St. Louis.	93	1,166,692	207,150	1,507,309	201,991	167,756	22,874	559,363	56,265	989,565	65,65	270,439
Texas & Fort Smith.	469	4,770,805	1,530,851	7,118,741	1,979,732	2,031,222	82,267	2,667,414	198,178	7,337,249	103,07	970,892
Texas & Pacific.	1,946	18,117,237	8,944,554	29,549,765	5,794,966	6,553,016	350,500	13,309,398	892,845	27,282,518	92,33	2,018,362
Toledo & Ohio Central.	488	7,899,892	635,495	9,046,745	1,397,978	2,782,185	93,304	4,255,477	205,013	8,763,752	96,87	351,974
Toledo, Peoria & Western.	247	882,609	458,962	1,476,664	256,564	394,720	24,835	876,941	64,747	1,617,746	109,55	67,274
Toledo, St. Louis & Western.	454	7,553,212	327,825	8,286,256	1,835,177	1,682,337	114,711	3,398,922	138,035	7,165,694	86,48	197,467
Trinity & Brazos Valley.	368	1,094,647	207,049	1,386,476	586,246	482,677	21,199	701,501	111,227	1,902,669	137,23	104,123
Union R. R. (of Pennsylvania).	128	509,066	347,964	1,096,153	186,138	783,855	23,055	783,855	65,625	1,270,317	115,89	38,192
Union Pacific.	3,614	66,064,717	16,712,972	93,490,064	15,603,746	18,281,637	768,431	28,495,218	2,817,499	68,312,479	73,07	5,735,236
Utah.	98	1,389,145	6,989	1,400,044	180,246	272,441	1,893	350,882	26,442	802,105	57,29	242,424
Vicksburg, Shreveport & Pacific.	171	2,104,597	891,373	3,264,873	626,712	639,786	69,246	1,296,238	109,570	2,775,792	83,20	7,273
Virginian.	523	10,887,694	629,818	12,497,071	1,534,991	2,347,156	73,568	4,651,740	269,550	9,061,193	72,55	1,159,984
Washington.	2,472	29,986,742	8,266,193	42,273,795	11,315,366	11,315,366	812,774	18,777,895	1,421,238	43,676,737	102,85	4,269,790
West Jersey & Seashore.	361	2,864,872	6,996,292	1,476,664	2,411,068	2,249,691	98,957	5,801,747	234,387	10,571,573	99,39	1,027,901
Western Maryland.	773	1,940,805	930,156	13,798,075	3,015,332	4,722,776	362,564	5,966,214	404,317	14,197,679	106,39	1,325,269
Western Pacific.	1,017	9,039,578	1,985,445	11,653,471	2,003,643	1,798,111	247,389	4,121,301	332,116	8,745,571	75,05	568,400
Western Railway of Alabama.	133	1,157,433	705,996	2,083,187	318,090	456,314	53,336	779,349	73,418	1,714,906	82,28	3,642
Winning & Lake Erie.	111	10,707,711	631,430	12,459,190	2,097,130	3,135,337	128,567	5,750,325	202,516	12,077,325	115,89	1,171,157
Wichita Falls & Northwestern.	328	1,386,462	455,995	1,977,853	288,225	3,662	9,862	5,032,34	2,007,325	2,007,325	103,18	39,297
Yazoo & Mississippi Valley.	1,381	16,109,939	4,410,907	21,792,654	5,145,782	5,315,782	234,319	8,881,864	585,152	20,207,139	97,73	2,916,191

Yazoo & Mississippi Valley 1,381 1,541,123 116,963 2,162,053 456,075 581,346 27,203 892,019 66,750 2,028,542 93,82 133,513 91,880 41,402 —611,709

A. S. C. E. Votes "No" on Federated Societies

With a vote of 3,278 against and 2,330 for, the American Society of Civil Engineers, through a popular vote of its members, has decided against becoming a charter member of the Federated American Engineering Societies. This in a way reaffirms the attitude of the members of the society as expressed in the results of the questionnaire of April 14, 1920. At that time the society expressed its desire to co-operate with other engineering and technical associations in promoting the welfare of the engineering profession, but voted against any participation in the federation plan which was proposed at that time and which has since culminated in the Federated American Engineering Societies.

New York Railroad Club Meeting

The meeting of the New York Railroad Club in the Engineering Societies building, New York, on Friday evening, November 19, will be the annual meeting, including the annual reports and the installation of the new president. The topic for discussion will be "Loss and Damage to Freight." The following viewpoints will be presented: "The Operating Officer," H. H. Shepard, general superintendent, Delaware, Lackawanna & Western; "The Freight Claim Agent," Thomas C. Smith, freight claim agent, Central Railroad of New Jersey; "Pilfering and Robbery," Alexander S. Lyman, general attorney, New York Central; "Defective Freight Cars and Their Relation to Loss and Damage," F. S. Gallagher, engineer of rolling stock, New York Central; "Packages and Containers and Their Relation to Loss and Damage," W. J. Edwards, manager, Trunk Line Inspection Bureau.

Average Haul of Freight Increasing

The distance over which the average ton of freight is transported by railroad has been steadily increasing for several years, according to Interstate Commerce Commission statistics. Its detailed figures for 1918 just issued show that the typical haul on the average railway in that year was 175.81 miles, as compared with 173.77 in 1917, 166.28 in 1916 and 162.59 in 1915. The report for 1919 has not yet been compiled but the commission has been issuing monthly statements this year which show that in July the average haul per railroad was 181.16 miles, as compared with 173.68 in July, 1919. Considering the Class I railroads as a single system, the average ton of freight in 1918 was hauled 301.47 miles as against 292.57 in 1917, 282.99 in 1916 and 275.80 in 1915.

The average journey per passenger has also been increasing although a slight decrease is shown in July this year as compared with July, 1919. In 1918 it was 39.33 miles; in 1917, 37.01 miles; in 1916, 34.38 miles, and in 1915, 33.95 miles. In July this year it was 41.80 as against 42.02 in July, 1919.

Meeting of Automatic Train Control Committee

The committee on automatic train control appointed by the American Railway Association to co-operate with the Interstate Commerce Commission held a meeting at Washington on November 5 and conferred with Commissioner C. C. McChord and W. P. Borland, director of the commission's Bureau of Safety. The committee devoted most of the meeting to a discussion of questions of policy and an exchange of ideas. G. E. Ellis, who was executive secretary of the Committee on Automatic Train Control of the Railroad Administration, has been appointed secretary, with office at the committee's headquarters in Chicago. Mr. Ellis was formerly connected with the Bureau of Safety and his office will be the point of contact with Mr. Borland. President R. H. Aishton, of the American Railway Association, also attended the meeting. In the morning the sub-committee met with Mr. Borland and was addressed by Commissioner McChord and in the afternoon the full membership of the committee held a meeting at which Mr. Borland was present. Commissioner McChord at this meeting emphasized the fact that the commission desires to work in co-operation with the railroads in this matter, as it has been doing in other matters, such as car service, since the passage of the transportation act. Mr. Borland also addressed the committee. He declared that the Interstate Commerce Commission, during the 14 years in which it has been studying the automatic train control question has made enough tests of train

stop devices to satisfy it that the theory of automatic train control is practical and that such devices, if developed properly, would have an important influence in increasing safety; that there has been a public demand for such a safety device which Congress has recognized in the provision of the law which places a definite responsibility upon the commission for its further development. The present problem is to determine whether automatic train control can be satisfactorily co-ordinated with practical railroad operating conditions, and it is the purpose to take for investigation one or more devices which are available, for installation on a railroad already equipped with automatic block signals and subject the device or devices to actual service conditions over a sufficient length of road to form a basis for definite conclusions.

How to Use Fusees

The Bureau of Explosives in its last circular gives the following suggestions to promote the maximum of efficiency in the use of fusees:

The composition of a fusee is contained in a pasteboard tube crimped at the top end, so as to leave only a small opening in the top. The priming composition is placed in this opening. During the early stage of burning, before the crimped head of the tube is burned away, and before the priming is entirely consumed, the fusee is very difficult to extinguish, as the crimped end holds the burning composition in the tubes. When the crimped head is burned away, hard jolts frequently cause the burning upper layer of the composition in the tube to completely fall out of the fusee, leaving the body of the fusee entirely without fire.

Fusees should not be thrown from a moving train, but should be dropped, spike end down, at an angle of about 45 degrees.

These should be dropped about five seconds after the priming is ignited, as at this period they are most resistant to rough handling and to being extinguished. It will be found that lighted fusees dropped in this manner from moving trains will almost invariably continue burning until entirely consumed. The proper time of dropping the lighted fusee is the most important point in avoiding failures in service.

New England Roads Ask Help

The need of the New England railroads for a much larger increase in revenues than they can expect from the increase of 40 per cent in freight rates and 20 per cent in passenger fares allowed to the Eastern railroads generally by the Interstate Commerce Commission, was explained by officers of the New England roads at a conference with New England shippers and state railroad commissioners, held in the Interstate Commerce Commission building at Washington on November 10. J. H. Hustis, president of the Boston & Maine, and Vice-Presidents E. J. Buckland and Benjamin Campbell, of the New Haven, told the shippers that September returns and estimates for October under the new rates indicate that the New England roads as a group will still be short of a 6 per cent return for the year by approximately \$36,000,000.

The subject was presented by the railroad officers as one on which they desire the co-operation and suggestions of the shippers, but they declared that there were only two alternatives. As the first they mentioned an early decision by the Interstate Commerce Commission on the application of the New England roads for larger divisions out of the joint through rates into and out of New England which has been filed with the commission. The commission itself in the rate decision suggested the possibility of larger divisions for the New England roads. Unless this can be arranged, they said, a large increase in rates would be necessary. Particular emphasis was placed on the question of divisions and the exact amount of a rate increase that would be necessary was not mentioned at the conference, although it is understood that a further increase of 35 per cent in freight rates and an increase in passenger fares to 4 cents a mile has been discussed as representing the amount necessary. A number of the shippers also spoke and expressed a willingness to help the roads. It was decided to arrange for a further conference between the New England shippers and representatives of the trunk line railroads, to be held under the auspices of the commission, to see what could be done toward increasing the divisions of the New England roads.

Traffic News

The Boston & Maine has opened a freight and passenger office in Chicago, 327 La Salle street, in charge of James M. Gall, general western agent.

The coal delivered to vessels by the Baltimore & Ohio in October at its piers at Curtis Bay and Locust Point, Baltimore, totaled 734,055 tons, the largest October movement on record.

The New York, New Haven & Hartford announces that beginning December 13, a sleeping car will be run daily each way between Boston, Mass., and Miami, Fla. Southbound the car leaves Boston on the Federal express at 7:30 p. m. The car will run over the Atlantic Coast Line.

Coal loaded into vessels at Port Richmond, Philadelphia, by the Philadelphia & Reading Railway, in the month of October amounted to 529,213 tons. This is 133,345 tons more than the movement in October, 1919, and is the largest monthly record in the history of the Port Richmond terminal. This record of 529,213 tons is made up of 100,972 tons of anthracite and 428,241 tons of bituminous.

The various organizations of commercial travelers are said to be preparing a joint complaint to be filed with the Interstate Commerce Commission against the railroads, protesting against the 50 per cent surcharge for Pullman passengers which was recently authorized by the commission. A complaint against the 20 per cent increase in Pullman rates has already been filed and a hearing was to have been held at Washington this week, but it was postponed. The commercial travelers are also said to be preparing to ask the railroads for a conference on an interchangeable mileage hook ticket.

The Supreme Court of New York, Appellate Division, on November 10, denied the right of the New York Central to continue charging fare of three cents a mile (or higher) for passengers over that part of the company's lines which are subject to the two-cent limitation imposed by the charter of 1853. The company's suit to annul the order of the Public Service Commission, requiring a return to the two-cent rate, will now be taken to the Court of Appeals. The opinion by Judge Woodward holds that the question for the court to decide is whether the federal transportation act of 1920 has operated to fix a three-cent-a-mile rate until the legislature should take action. Judge Woodward's interpretation is that it was not the intent to continue the rate fixed by the Director General during the period of government control past September 1, 1920.

Traffic Club of Chicago

The monthly meeting of the Traffic Club of Chicago was held on November 9. C. R. Gray, president of the Union Pacific, addressed the meeting on "The New Railroad Era." A resolution was adopted that a national guard company be formed from members of the club, their families and friends.

The Cost of Three Holidays in Coal

The anthracite mines of Pennsylvania were idle on Mitchell Day, October 29; All Saints Day, November 1, and Election Day, November 2, and the amount of coal lost by this suspension of work, according to preliminary figures based on returns from 15 leading producers, and calculated on the regular daily averages of production, was 714,128 tons, including probably 540,409 tons of household coal, or sufficient to have cared for a city of more than 200,000 inhabitants for a year. New York, Washington and other cities have complained that they have not received to date as much anthracite as was received to corresponding dates in former years. The amount of production lost in the three holidays mentioned would have been sufficient to have made up the entire reported shortage in New York and Washington and for several thousand additional families.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has announced proceedings of investigation as to the failure of the state commissions of Nevada and Georgia to put into effect increases in rates for intrastate traffic corresponding to those authorized by the commission for interstate traffic.

The commission has suspended until March 10 the operation of the proposed elimination of the routing of grain and grain products to trunk line territory via the C. C. C. & St. L., through Indianapolis, from points on the Toledo, St. Louis & Western in Indiana, provided in Supplement No. 16 to Agent W. J. Kelly's tariff, I. C. C. No. 839, resulting in the application of combination rates.

Kansas Petition Denied

The commission has announced that it has denied the petition of the Court of Industrial Relations of the State of Kansas for a rehearing of the general rate advance case, Ex Parte 74. The Kansas court had asked for the rehearing on the ground that the commission had made an error in its calculation of the needs of the western railroads amounting to \$192,000,000 and that the commission had allowed the western railroads, except those in the Mountain-Pacific group, an increase of 35 per cent in freight rates and the roads of the Mountain-Pacific group an increase of 25 per cent, whereas the Kansas court figured that 25 per cent would have been enough for all the western roads.

Minimum Weights on Grain

Existing minimum weights on grain and grain products upon interstate traffic are in effect by virtue of Special Permission 50450 of the Interstate Commerce Commission, and expire December 31, 1920. Similar minimum weights apply upon intrastate traffic in many states by action of state commissions. Applications have been received from the carriers, some seeking authority to continue the present minimum weights and others to re-establish a minimum weight of 60,000 lb. on grain and otherwise continue the present minima.

Considering the desirability of uniformity, the commission has decided to call a conference of state commissions, shippers, carriers and others to discuss the situation at the Jefferson hotel, St. Louis, Mo., November 15, at which the commission will be represented by W. V. Hardie, director of traffic.

State Commissions

The Public Service Commission of Alabama has authorized the railroads of that state to make a general increase of 20 per cent in passenger fares and of 25 per cent in freight rates, but only for six months, from November 1. The petition of the railroads for authority to impose a surcharge of 50 per cent on fares of passengers traveling in Pullman cars was denied, as was that for authority to increase by 25 per cent the freight rates on iron ore and limestone for industrial plants.

Court News

Penalties Incurred During Federal

Control Not Recoverable

Since the government, when it took control of the railroads, provided by order for ordinary suits delict, but announced that it could not be sued for a penalty, fine, or forfeiture at the hands of a citizen, the South Carolina Supreme Court holds that a railroad company is not liable for any misfeasance while its road was being operated by the government or its agents, and a service of summons against the company for such a misfeasance should be set aside.—*Harmon v. Southern (S. Car.)*, 101 S. E. 926.

Duties to Trespassers in Open Country

In the open country a railroad backing its engine with the tender in front, on which was a lighted headlight, does not owe the duty, even to a licensee, to station a man on the tender to maintain a lookout; and as the company's liability to a trespasser in such circumstances does not depend on the company's rules, a rule requiring a lookout is not admissible in behalf of plaintiff in an action for death.—*Louisville & Nashville v. Stidham* (Ky.), 218 S. W. 460.

Railroad's Books as Evidence of Delivery of Cotton

In an action against a railroad company for the value of cotton destroyed by fire while in its possession as carrier, the Mississippi Supreme Court holds that the railroad company's books, tending to show that the cotton was delivered to a compress company according to custom, and a bill of lading constituting the compress company agent of the shippers to receive the shipment, were improperly excluded, and a peremptory instruction to find for the plaintiff was error.—*Illinois Central v. Threefoot Bros.* (Miss.), 83 So. 635.

Limitation of Liability Applies to

Embezzlement and Theft by Employees

Following decisions of the federal courts, the Texas Court of Civil Appeals holds that a limitation of liability in an interstate contract of shipment to the declared value of the goods applies to a case of embezzlement or theft by an employee of the carrier, without the consent or connivance of the carrier itself, and this although gross negligence of the carrier is shown, making the embezzlement or theft by an employee easy of accomplishment and difficult of detection.—*Henderson v. Wells Fargo & Co., Express* (Tex.), 217 S. W. 962.

Releases of Liability Under Federal

Employers' Liability Act

The Georgia Court of Appeals holds that the well established principle of law that, before a party to a contract is entitled to have it rescinded for fraud in its procurement, he must pay back or tender any valuable consideration received under the terms of the contract, applies to an action for personal injuries brought under the Federal Employers' Liability Act, where the plaintiff, after the infliction of the injury which was sued for, signed, for a valuable consideration, a contract releasing the defendant from all liability therefor.—*Central of Georgia v. Hoban* (Ga.), 102 S. E. 46.

Contract Releasing Railroad from

Fires on Private Sidetracks

The West Virginia Court of Appeals holds that a contract between a railroad company and a private corporation, whereby in consideration of the latter's release of the railroad company from all damages caused by fire that may be set by it, the railroad company agrees to build and maintain a private sidetrack over its right of way and adjoining land, for the private use of such corporation, its successors and assigns, is not invalidated by a statute imposing certain duties on railroad companies as to removing dry grass and other inflammable materials from their rights of way, and putting out fires thereon and on adjoining lands. An assignee, lessee or under tenant operating the sidetrack is bound by the contract releasing the railroad, whether they have actual notice of it or not. Such a contract applies to lumber set out by an assignee or sublessee on an extension to the sidetrack built by him and operated jointly by him and the railroad company.—*Keystone Mfg. Co. v. Hines* (W. Va.), 102 S. E. 106.

Personnel of Commissions

Alfred M. Barrett, hitherto deputy commissioner, has been appointed Public Service Commissioner, First District, State of New York, office New York City, in place of Lewis Nixon, resigned.

Foreign Railway News

Exports of Steam Locomotives in September

The exports of steam locomotives in September totaled 154, valued at \$4,105,405. Of these 36, valued at \$1,080,000, were destined for France, and 28, valued at \$182,000, for Italy. Cuba was the purchaser of 21, valued at \$491,604. China likewise had 21, of a value of \$816,070. The detailed figures by countries, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, are as follows:

Countries	Number	Dollars
France	36	1,080,000
Italy	28	182,000
Roumania	10	650,000
Spain	15	621,000
Canada	6	96,711
Mexico	8	45,405
Newfoundland and Labrador	1	20,445
Cuba	21	491,604
Dominican Republic	2	26,500
Colombia	2	45,020
China	21	816,070
Philippine Islands	2	15,900
British South Africa	2	14,750
Total	154	4,105,405

Exports of Car Wheels and Axles in September

The exports of car wheels and axles in September had a total value of \$846,198. By far the largest shipments, valued at \$350,701, were to France. Japan came next with consignments valued at \$185,556. The detailed figures by countries, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, are as follows:

Countries	Dollars
France	350,701
Italy	27,051
Canada	44,989
Guatemala	973
Honduras	1,396
Panama	76
Salvador	142
Mexico	10,644
Newfoundland and Labrador	13
Cuba	60,546
Dominican Republic	643
Argentina	11,762
Brazil	4,416
Chile	47,935
Colombia	2,245
Ecuador	905
Venezuela	468
China	52,890
British India	21,252
Dutch East Indies	18,781
Japan	185,556
Australia	763
French Oceania	41
Philippine Islands	2,010
Total	846,198

Railroad Accidents in Great Britain, 1919

The number of train accidents on the railroads of Great Britain and Ireland in the year 1919 was 1,278, consisting of 292 collisions, 527 derailments and 459 other accidents. In these accidents three passengers, seven employees and eight other persons were killed and 513 passengers, 114 employees and 30 other persons were injured; a total of 18 killed and 657 injured; this on a railroad mileage of 26,724 miles.

In "train service" accidents 83 passengers, 318 employees and 426 other persons were killed, and 1,835 passengers, 3,845 employees and 217 other persons were injured. In "non-train" accidents 12 passengers, 52 employees and 23 other persons were killed, and 429 passengers, 16,489 employees and 445 other persons were injured. The totals of the three classes aggregate 932 persons killed and 23,983 injured. The number of passengers killed in train accidents in 1918 was eight; comparisons of other items with the preceding year are not striking. The annual accident report, formerly made in the office of the secretary of the railway department of the Board of Trade, is now made by the chief inspecting officer, Colonel J. W. Pringle, reporting to the Director General, Public Safety and General Purposes Department of the Ministry of Transport.

Exports of Railway Cars in September

The exports of passenger cars in September amounted to 3, of a total value of \$5,900; of freight cars 1,838, of a total value of \$3,061,817; of cars for other than steam railways, 257, of a value of \$224,176; and exports of car parts were valued at \$470,735. The largest exports of freight cars were to France, Poland, Mexico, Italy and Cuba in the order named. The detailed figures by countries, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, are as follows:

Countries	Passenger (Steam)		Freight and other		For other railways		Parts of cars. Dollars
	Num-ber	Dol-lars	Num-ber	Dol-lars	Num-ber	Dol-lars	
Belgium							1,567
Denmark							22,362
France			438	936,853			780
Italy			250	457,500			2,406
Poland and Danzig			400	320,000			14,711
Spain							66,249
England							217
Canada	1	2,700	22	34,923	31	35,527	22,657
Guatemala					5	27,200	
Salvador	2	3,200	327	555,561	46	4,769	
Mexico							139
Newfoundland and Labrador							428
Trinidad and Tobago			283	453,432	78	85,407	95,043
Cuba					1	625	
Haiti					62	54,808	5,902
Dominican Republic			4	4,314	10	1,100	8,595
Argentina					20	10,275	40,570
Brazil							7,742
Chile			50	166,016			4,155
Colombia							58,488
China							2,340
Chosen							3,200
British India			14	23,850			2,232
Straits Settlements					2	3,531	1,274
Dutch East Indies							79,615
Japan					2	934	27,231
Philippine Islands							2,832
British South Africa			50	109,368			
Portuguese Africa							
Total	3	5,900	1,838	3,061,817	257	224,176	470,735

Exports of Railway Track Material in September

The exports of rails in September totaled 31,170 tons, valued at \$2,008,699, setting a new low mark for the year. Exports of spikes totaled 1,874,136 lb., valued at \$85,297, and switches, frogs, splice bars, etc., were valued at \$366,724. The detailed figures by countries, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, are as follows:

Countries	Spikes		Steel rails		Switches, frogs, splice bars, etc.
	Pounds		Tons		
Denmark					\$8,944
Netherlands					216
Norway					77
Sweden			3,030	\$225,000	916
England	448	\$159	339	23,617	7,932
British Honduras	7,000	420	4,765	257,719	216
Canada	144,324	6,601			30,268
Costa Rica					672
Guatemala	2,000	158	6	479	4,993
Honduras	200	20	235	10,739	1,493
Panama					
Salvador	25,000	1,972			
Mexico	136,989	9,086	551	34,582	33,496
Jamaica					150
Trinidad and Tobago					1,740
Cuba	744,639	31,378	6,135	334,281	145,386
Haiti	10,000	575			
Dominican Republic	1,000	85	148	10,264	10,827
Argentina			357	22,539	17,860
Bolivia					67
Brazil	193,600	9,149	4,670	307,870	13,221
Chile			56	4,579	
Colombia	398,115	13,764	1,047	96,373	2,305
Ecuador	40,000	2,700			
Dutch Guiana					153
Paraguay			96	4,557	1,151
Peru	17,600	1,159	8	627	9,010
Uruguay			50	2,977	
Venezuela			150	10,057	
China	3,968	115	248	15,875	5,169
Kwantung					305
British India			113	6,137	150
Dutch East Indies			324	22,409	4,519
Hongkong	10,800	800	392	40,967	2,923
Japan	66,036	2,475	2,015	177,774	3,916
Australia					562
Philippine Islands	72,417	4,681	1,643	139,838	31,520
Belgian Congo					6,846
British South Africa			54	3,270	
French Africa			4,437	239,598	
Portuguese Africa			301	16,571	19,721
Total	1,874,136	\$85,297	31,170	\$2,008,699	\$366,724

Equipment and Supplies

Locomotives

THE MISSISSIPPI CENTRAL is inquiring for some 4-6-0 type locomotives.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE is inquiring for some 4-6-2 type locomotives.

THE LOS ANGELES & SALT LAKE has ordered four locomotives from the Baldwin Locomotive Works.

THE CENTRAL SANTO TOMAS, Cuba, has ordered one locomotive from the Baldwin Locomotive Works.

THE NATIONAL RAILWAYS OF MEXICO have ordered 5 locomotives from the Baldwin Locomotive Works.

THE UNITED FRUIT COMPANY, Cifuentes, Cuba, has ordered one locomotive from the Baldwin Locomotive Works.

THE FORESTRY BUREAU, Hokkaido, Japan, has ordered four 0-4-2 type locomotives from the Baldwin Locomotive Works.

THE CUBA SUGAR MILLS CORPORATION, Havana, Cuba, has ordered two locomotives from the Baldwin Locomotive Works.

THE MISSOURI PACIFIC is inquiring for 25 Mikado type locomotives, 5 Mountain type, 5 Pacific type and 15 switching locomotives.

WHITEHEAD BROTHERS COMPANY, 537 West Twenty-seventh street, New York, has ordered one four-wheel switching locomotive from the American Locomotive Company.

THE TEMISKAMING & NORTHERN ONTARIO, reported in the *Railway Age* of November 5, as inquiring for 4 Pacific type locomotives, has ordered this equipment from the Canadian Locomotive Company, Ltd.

THE HYDRO ELECTRIC POWER COMMISSION, Niagara Falls, Ontario, has ordered two four-wheel switching locomotives from the American Locomotive Company. These locomotives will have 16 by 24 in. cylinders and a total weight in working order of 99,000 lb.

Freight Cars

THE ATLANTIC COAST LINE is inquiring for 30 caboose cars.

THE LOUISVILLE & NASHVILLE is inquiring for 2,000 steel hopper cars of 55 tons capacity.

THE BANGOR & AROOSTOOK is inquiring for 100, 40-ton, single-sheathed, standard A. R. A. box cars.

THE CINCINNATI, INDIANAPOLIS & WESTERN is inquiring for 300 composite gondola cars of 50 tons capacity.

THE CANNELTON COAL & COKE COMPANY, Cannelton, Pa., is inquiring for from 500 to 1,000 50-ton hopper cars.

THE UNION COAL & COKE COMPANY, Philadelphia, W. Va., has ordered 250 coal cars from the Cambria Steel Company.

THE PHILADELPHIA & READING is having 500 steel cars repaired at the shops of the American Car & Foundry Company.

Passenger Cars

THE NEW YORK, NEW HAVEN & HARTFORD is inquiring for 124 steel underframes for passenger coaches.

Iron and Steel

THE CHESAPEAKE & OHIO has ordered 15,000 tons of rails from the United States Steel Corporation.

Supply Trade News

The Cement Gun Company, Inc., has removed its main office from Allentown, Pa., to Cornwells, Bucks County, Pa., a suburb of Philadelphia.

F. E. Symons, vice-president of the **Ralston Steel Car Company**, Columbus, Ohio, has been elected president to succeed Joseph S. Ralston, deceased.

G. Schirmer has resigned as sales engineer in the Detroit office of the **Whiting Foundry Equipment Company**, Whiting, Ill., and is now associated with **W. C. Bennett**, industrial engineer, Chicago.

The Manufacturers' Sales Company has been organized, with offices in the Leader-News building, Cleveland, Ohio, to represent in Cleveland and surrounding territory, one or possibly two large reliable manufacturers for the sale of their products. **C. C. Bradford**, for a number of years sales manager of the **U. S. Light & Heat Corporation** and more recently sales manager of the **Marlin Rockwell Corporation**, is manager of the new enterprise.

Donald S. Barrows, chief engineer and works manager of **The T. H. Symington Company**, New York, since 1917, with headquarters at Rochester, N. Y., has been elected vice-president in charge of operations. He was born at New Haven, Conn., in 1877, and graduated from the New York Law School in 1898 and was admitted to the bar in New York State in 1899. Following his entry into the engineering field and previous to his association with the Symington organization Mr. Barrows held the following positions: Chief engineer of the North Penn Iron Company, Philadelphia, Pa.; chief engineer of the Insley Iron Works, Indianapolis, Ind.; mechanical engineer of the Wingham-Magor Car & Manufacturing Company, and mechanical engineer with the American Car & Foundry Company, at New York. Mr. Barrows entered the service of The T. H. Symington Company in 1915, and as chief engineer had charge of all engineering matters in connection with the Symington railway products as well as the planning, enlargement and execution of extensive plant improvements. In 1917 he was promoted from the position of chief engineer to chief engineer and works manager, and now becomes vice-president in charge of operations. In the development of the Symington company's extensive railway business at Rochester to its present state of efficiency in quality and quantity production Mr. Barrows has been largely responsible.



D. S. Barrows

Bruce Hartman, of Bloomsburg, Pa., a director of the **Bell Locomotive Works**, was appointed receiver of the company, on November 9, by Federal Judge Witmer at Sunbury, Pa. The company's office is at 23 Water street, New York, and its works are at Bloomsburg. **J. S. McCormack**, sales manager, and **William Stevenson**, chief engineer, in the New York office, will probably remain with the company under the receiver.

Fairbanks, Morse & Co., Chicago, have bought the entire business consisting of all stock on hand, good-will and liabilities of the **Luster Machine Shop & Railway Equipment Com-**

pany, 917 Arch street, Philadelphia, Pa. Fairbanks-Morse have opened a new branch at this address under the management of **D. W. Dunn**, and will sell its complete line of engines, motors, pumps, etc. The entire personnel of the **Luster Machinery Co.** has been retained. **E. J. Luster**, former president, will be manager of the machine tool division of the Fairbanks-Morse Philadelphia branch.

An unusual tribute to an employee is a booklet recently published by the **Watson-Stillman Company**, Aldene, N. J., in commemoration of the fifty years of service of **Walter Watson**, with the Watson-Stillman Company. Mr. Watson had been in the service of the company as a machinist continuously since first entering the service on November 1, 1870. The directors of the Watson-Stillman Company recently conferred upon Mr. Watson and nine other employees who have been in the service more than 20 years, appropriate souvenirs in recognition of their service.

Hugh Pattison has joined the staff of the heavy traction railway department of the **Westinghouse Electric & Manufacturing Company** to make special engineering studies under the direction of **F. H. Shepard**, director of heavy traction. Mr. Pattison was graduated from the Johns Hopkins University, electrical engineering course, in 1892. His first position was that of foreman electrician of the Norfolk, Va., Navy Yards, wiring and installing electric apparatus on naval vessels. In 1893 he became assistant engineer with **Sprague, Duncan & Hutchinson**, consulting engineers at Baltimore. From 1894 to 1903 he was associated as engineering assistant to **Frank J. Sprague**, vice-president and technical director of the **Sprague Electric Company** in New York and assisted in equipping and operating multiple unit control on the Boston Elevated and in Brooklyn. In 1905 Mr. Pattison joined **Westinghouse, Church, Kerr & Company** as an engineer. From 1905 to 1911, during the electrification of the Pennsylvania tunnel into New York, Mr. Pattison was assistant engineer of electric traction for **George Gibbs**, consulting engineer. Later Mr. Pattison had charge of the electrification of the **West Jersey & Seashore Railroad** from Camden to Atlantic City. He also built an experimental single-phase electric railway on the **Long Island Railroad** and had charge of the conduct of locomotive tests on the **West Jersey & Seashore Railroad** to determine the effect on track. In 1911 he was appointed engineer in charge of the **Chicago Association of Commerce Committee** in the study of smoke abatement and the electrification of terminal railways in Chicago. During the war Mr. Pattison was appointed assistant to general manager of the **Remington Arms Company**.

Obituary

Arthur E. Hauck, president of the **Hauck Manufacturing Company**, makers of oil burning appliances, kerosene torches, furnaces and forges, Brooklyn, N. Y., died at his home in that city on October 30, at the age of 41. He was born in Germany, where he learned the trade of coppersmith. At the age of 20 he came to American and in 1902 began business in Brooklyn. He was the inventor of a number of appliances for burning oil, one of which was the method of vaporizing kerosene in a torch with proportioned heat-resisting nozzle, the form of vaporization which is used to reduce carbonization to a minimum.

Henry C. King, president of the **American Mason Safety Tread Company**, Boston, Mass., died on October 28, 1920, after over 50 years of active business life. He was born in Tunbridge, Vt., in 1852, where he lived as a young man and received his education. At an early age he went to Lawrence, Mass., where for several years he was merchant and manufacturer. In company with **William S. Lamson**, he introduced the **Mason Safety Tread** in America, early in the year 1895, and thus became one of the pioneers of the safety first movement. He was treasurer of the **American Mason Safety Tread Company** for 18 years, and succeeded to the presidency after the death of Mr. Lamson in 1912.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company contemplates the enlargement of its Harvey house (hotel and restaurant) at San Bernardino, Cal., at an approximate cost of \$90,000. The company also plans the construction of a new passenger and freight station, and an extension to its yard facilities at White Deer, Tex., to cost about \$43,000, and the building of a water-treating plant at Dodge City, Kan., which will cost approximately \$23,000. This company contemplates the construction of a machine shop at San Bernardino, Cal., to cost approximately \$200,000.

BALTIMORE & OHIO.—This road, in co-operation with the city of Youngstown, Ohio, contemplates the elevation of Division street, Youngstown, by means of a viaduct to carry the roadway over the railroad tracks and across the Mahoning river.

CENTRAL OF NEW JERSEY.—This company has awarded a contract to the Phenix Bridge Co., for the construction of a bridge, near Maurer, N. J., to replace the present structure. The new bridge will consist of a 78 ft. bascule draw span and one 65 ft. approach span and will carry two tracks.

CHICAGO & ALTON.—This company has awarded a contract to Mulville Bros., Auburn, Ill., for the grading in connection with the construction of a second track between Manchester, Ill., and Roadhouse.

DAYTON & TROY ELECTRIC.—This company has under construction a freight terminal at Dayton, O., which will cost approximately \$150,000.

DULUTH & IRON RANGE.—This company is constructing a highway viaduct over its tracks, a 75,000 gal. concrete water tank and a new track scale at Biwabik, Minn.

GRAND TRUNK.—This company has under construction a wooden freight shed and wharf at Portland, Me. The new structure will be 100 ft. by 390 ft., and will cost approximately \$169,000. The work is being done by the company's forces.

GULF, MOBILE & NORTHERN.—The Interstate Commerce Commission has ordered a hearing at Washington on November 22, on the application of this company for a certificate authorizing the abandonment of a branch line from Ellisville Junction to Ellisville, Miss.

ILLINOIS CENTRAL.—This company has awarded contracts to Joseph E. Nelson & Sons, Chicago, for the construction of two transformer houses at East St. Louis, Ill., and one transformer house at Mounds, Ill.

MISSOURI PACIFIC.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of a power plant at Dupu, Ill., to cost approximately \$15,000.

SOUTHERN.—This company is building a brass foundry at its Lenoir Car Works, Lenoir City, Tenn., which will cost approximately \$30,000. The building will be one story, 62 ft. by 120 ft., of brick and concrete construction. This addition to the plant will involve the purchase of 5 revolving furnaces, a metal separator and a journal bearing boring machine.

SOUTHERN PACIFIC.—This company will construct the following buildings at Sacramento, Cal.: A reinforced concrete oil and paint house, 65 ft. by 100 ft.; a store building of mill construction with corrugated iron sides, and concrete foundation, 500 ft long and 60 ft. wide, and a planing mill of mill construction, with corrugated iron sides and roof, to be 126 ft. wide and 360 ft. long.

UNION PACIFIC.—This company contemplates additions to its terminal facilities at Kansas City, Kan., and Marysville, Kan.

UNION STATION.—This company is accepting bids for the construction of a concrete tunnel 5 ft. 6 in. by 7 ft., in section under Harrison street, Chicago. The tunnel will extend for a distance of 246 ft. between Canal street and the Chicago river.

Railway Financial News

CHICAGO, BURLINGTON & QUINCY.—See article entitled "Burlington Asks Authority to Capitalize Surplus" on another page of this issue.

CHICAGO, ROCK ISLAND & PACIFIC.—The Interstate Commerce Commission on November 9, approved a loan to this company of \$1,425,000 to aid the carrier in making additions and betterments to equipment and \$6,437,000 for additions and betterments other than to equipment.

FORT SMITH & WESTERN.—The receiver has applied to the Interstate Commerce Commission for authority to issue a promissory note for \$156,000 and a receiver's certificate as collateral thereto, to be used as security for a loan from the revolving fund.

INDIANA HARBOR BELT.—The Interstate Commerce Commission has authorized this company to issue, within 60 days, \$2,200,000 of demand promissory notes, with interest at a rate not exceeding 7 per cent, for the payment of current expenses, pending the settlement of its government guaranty under which the company estimates that it is entitled to about \$3,000,000. The company is required by the order to pay the demand notes out of earnings within two years or out of the proceeds of the settlement of the guaranty.

LEHIGH & HUDSON RIVER.—This company has applied to the Interstate Commerce Commission for authority to issue additional capital stock to the amount of \$2,987,000, to pay its mortgage debt of \$2,587,000, which matured July 1, and also its debenture bonds, \$400,000, which matured on July 1.

NEW YORK CENTRAL.—This company has applied to the Interstate Commerce Commission for authority to issue \$7,000,000 refunding and improvement mortgage bonds, series B, under the mortgage of 1913, payable October 1, 1913, at 6 per cent, to be pledged with the director general of railroads as security for a promissory note dated October 25, 1920, for \$7,000,000 at 6 per cent, payable on demand for the indebtedness of the company to the government for additions and betterments.

NEW YORK, NEW HAVEN & HARTFORD.—This company has filed an application with the Interstate Commerce Commission for authority to issue not exceeding \$80,000,000 of first and refunding mortgage gold bonds at 6 per cent, maturing in 10 years, with permission to pledge part or all as security for notes to be given to the United States to fund the indebtedness of the company to the government incurred during the period of federal control, estimated at \$60,000,000. This includes the demand note for \$43,026,500 for a loan to the company during federal control, and also about \$17,000,000 for additions and betterments made to the company's property during federal control. The company also asks authority to issue not exceeding \$15,000,000 of the bonds maturing in 15 years, with permission to pledge them as collateral for a loan from the revolving fund. The company had applied for a loan of \$8,130,000.

NORFOLK & WESTERN.—This company has applied to the Interstate Commerce Commission for a certificate authorizing it to operate under lease three lines, including a part of three bridges over the Tug River between West Virginia and Kentucky, the property of the Tug River & Kentucky Railroad, and also the line of the Williamson & Pond Creek Railroad, the entire stock of which is owned by the Norfolk & Western. These lines were operated in connection with its system during federal control.

NORTHERN PACIFIC.—This company has applied to the Interstate Commerce Commission for a certificate authorizing it to abandon the operation of a branch line from Keystone Junction to Bayne, N. D., a distance of 1.87 miles and a spur track, 1.75 miles, over which only five cars of grain have been shipped in five years.

PENNSYLVANIA.—This company announced on November 9 that it has been decided to reopen and extend until December 31,

1920, the offer to purchase the remaining outstanding stock of the Pittsburgh, Cincinnati, Chicago & St. Louis, as all but a very small percentage of the minority stockholders of that road have accepted the offer made by the Pennsylvania company on March 15 to buy their shares. The question of leasing the property to the Pennsylvania company will be submitted to the Panhandle stockholders at a special meeting. Stockholders desiring to take advantage of the reopened offer are requested to deposit their stock, assigned in blank, with the treasurer of the Pennsylvania Railroad Company, Philadelphia, or the assistant treasurer at the company's office, 85 Cedar street, New York. Proper adjustment of the dividends on the stock and the accrued interest due on the bonds will be made with stockholders depositing their stock after December 1 and before December 31.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—See Pennsylvania.

RICHMOND TERMINAL RAILWAY.—This company has applied to the Interstate Commerce Commission for authority to issue six notes of \$500,000 each at 6 per cent, maturing serially from January 1, 1921, to January 1, 1924, to be given to holders of present outstanding demand notes amounting to \$3,000,235. The \$235 is to be paid in cash. The company also asked authority to issue two notes for \$50,000 each, payable on or before January 1, 1924, at 6 per cent, one to the Atlantic Coast Line and the other to the Richmond, Fredericksburg & Potomac, in evidence of cash loans.

SHEARWOOD RAILWAY.—The Interstate Commerce Commission on November 9, approved a loan of \$29,000 to this company to enable the company to meet maturing indebtedness and to provide itself with additions and betterments.

SOUTHERN PACIFIC.—The Interstate Commerce Commission has denied this company's application for a loan of \$5,028,000 from the revolving fund provided for in the transportation act to aid the company in providing itself with new equipment, on the ground that the showing which the company has made in respect of its inability to secure the necessary funds from other sources is not convincing. The act requires a finding by the commission that the applicants are unable to provide themselves with the necessary funds from other sources. The commission says that the only money borrowed by this applicant since the termination of federal control is \$15,000,000 by the sale of equipment trust certificates, which is characterized as "relatively unimportant, considering the value of the applicant's property, its available assets and its prospective earning power." The company had proposed to use the amount of the loan in connection with the purchase of cars and locomotives costing \$17,232,600, of which \$12,204,600 was to be financed by the company.

TEXAS & PACIFIC.—The Interstate Commerce Commission has authorized this company to issue \$477,000 of six per cent receivers' equipment notes in part payment for 200 100,000-pounds' capacity, steel underframe, Rodger ballast cars, contracted for in February, 1920, at a unit price of \$3,178.68.

TRANS-MISSISSIPPI TERMINAL RAILROAD.—This company, joined by the Texas & Pacific and its receivers, and the Missouri Pacific, has asked the Interstate Commerce Commission for authority to extend for three years and to guarantee three-year, 6 per cent gold notes of the Trans-Mississippi Terminal Company to the amount of \$3,653,000. The notes have been once extended for the three years ending November 1, 1920, at 7 per cent and it is proposed to extend them until November, 1923, at 7½ per cent.

UNION PACIFIC.—This company has submitted to the judgment of the Interstate Commerce Commission the question as to whether its authority is required by Section 20-a of the transportation act for the issuance under the company's first lien and refunding mortgage of June 1, 1908, of bonds payable in United States money upon conversion of bonds issued prior to June 27, 1920, payable in sterling, to the extent that such conversion results in an increase of the funded debt of the company. If the commission considers that such authority is required, the company makes application therefor. A similar application has been filed by the Oregon-Washington Railroad & Navigation Company.

Railway Officers

Executive

B. H. Hagerman, president of the Kansas, Oklahoma & Gulf, with headquarters at Kansas City, Mo., has resigned, effective November 1.

E. H. Coapman, vice-president in charge of operation of the Southern, with headquarters at Washington, D. C., has been granted a leave of absence to recover his health. During his absence the officers of the operating department will report to **H. W. Miller**, vice-president.

W. F. Turner, vice-president of the Spokane, Portland & Seattle, with headquarters at Portland, Ore., has been elected president, succeeding **L. C. Gilman**, whose resignation to be vice-president of the Great Northern was announced in the *Railway Age* of October 22 (page 728). Mr. Turner's appointment is effective November 15.

James M. Gruber, whose election as vice-president of the Cuba Railroad and the Camaguey & Neuvas, with headquarters at Camaguey, Cuba, was announced in the *Railway Age* of October 15 (page 678), was born at Iowa City, Iowa, March 22, 1868. He was graduated from the Iowa City High School and first entered railway service with the St. Paul, Minneapolis & Manitoba (now the Great Northern), in September, 1885, as a stenographer and clerk in the general freight office at St. Paul, Minn. In 1889 he became private secretary to the president of the Atchison, Topeka & Santa Fe. Subsequently he served with that company as chief clerk, first, to the division



J. M. Gruber

superintendent, next to the superintendent of transportation, and, finally, to the general manager. He then became train master of the Gulf, Colorado & Santa Fe. In January, 1895, he was appointed assistant superintendent of the Great Northern, and, in June of the same year, general superintendent of the Montana Central (now part of the Great Northern). In 1897 he became general superintendent of the Great Northern. Later he served the Chicago, Rock Island & Pacific and the Union Pacific in the same capacity. In February, 1905, he was appointed general manager of the Chicago, Burlington & Quincy. In 1907 he became general manager of the Great Northern and in 1912 was appointed vice-president in charge of the operating department. During federal control his duties remained the same, but he was given the title of general manager. In April, 1920, Mr. Gruber went to Southern Russia on a special mission for S. M. Vauclain, president of the Baldwin Locomotive Works. Upon his return he was elected to his present position.

Russell H. Snead, whose appointment as assistant to the president of the Chesapeake & Ohio, with headquarters at Richmond, Va., was announced in the *Railway Age* of November 5 (page 819), was born in Virginia, but while he was still young his parents moved to the West and Mr. Snead spent his boyhood days in the Rocky Mountain country. Educated in public and private schools, he first entered railway service in 1887 as a clerk in the auditing office of the express department of the Denver & Rio Grande, and re-

remained in the service of that company for 20 years, occupying in turn almost every position in the express department. In 1907 he resigned to accept the position of special examiner for the Interstate Commerce Commission, at Washington, D. C., and was active in drafting a system of accounts and reports prescribed for express companies by the commission. While still in the service of the commission, Mr. Snead compiled a special report on the express business for the Census Bureau, which was published in 1909. In 1912 he left the service of the commission to become manager of express traffic of the Chesapeake & Ohio and Hocking Valley, with headquarters at Richmond, Va. Later he was placed in charge of publicity matters, in addition to his other duties. As assistant to the president he will perform the same services as heretofore.

Financial, Legal and Accounting

O. Maxey has been appointed general supervisor of claim prevention of the Chicago, Rock Island & Pacific, with headquarters at Chicago, effective November 1. In addition to his new duties, Mr. Maxey will continue to have jurisdiction over scales, weighing, explosives and the reclamation, conservation and distribution of grain doors and other cooperage material. **W. H. King** and **A. L. Dewey** have been appointed district supervisors of claim prevention, with headquarters at Des Moines, Iowa, and El Reno, Okla., respectively, effective the same date.

Operating

A. L. Johnson has been appointed assistant to the general superintendent of the Denver & Salt Lake, with headquarters at Denver, Colo., effective November 1.

B. D. Richart, trainmaster of the Southern Pacific, with headquarters at Mina, Nev., has been transferred to a similar position with headquarters at Carlin, Nev., succeeding **F. F. Small**, who has been appointed chief dispatcher at Sparks, Nev. Mr. Small succeeds **H. G. Vallean**, assigned to other duties. **T. L. Williams**, road master, with headquarters at Mina, Nev., has had his jurisdiction extended to include the duties of trainmaster, succeeding Mr. Richart.

N. B. Walton, whose appointment as assistant general superintendent of the Grand Trunk Pacific, with headquarters at Prince Rupert, B. C., was announced in the *Railway Age* of September 24 (page 551), was born at Palmerston, Ont., on July 27, 1884, and entered railroad service in August, 1900, with the Grand Trunk. During the first seven years of his service, Mr. Walton served as clerk, operator and as secretary to the vice-president of the Grand Trunk. He was promoted then to trainmaster, but left in April, 1907, to go to the Great Northern, with headquarters at St. Paul, Minn. In January, 1908, he returned to the Grand Trunk as claim agent, a position which he held until October of that year, when he was made secretary to the general superintendent of the Grand Trunk Pacific. In August, 1910, he was promoted to trainmaster on the Grand Trunk Pacific and served both in that position and as assistant to the general superintendent, with headquarters at Winnipeg, Man., until July, 1911, when he was promoted to superintendent of the Edmonton division, with headquarters at Edmonton, Alta., the position which he held at the time of his recent promotion.

John E. Roberts, whose promotion to superintendent of transportation of the Delaware & Hudson was announced in the *Railway Age* of September 24 (page 550), was born at Bainbridge, N. Y., September 23, 1879. He studied at Williston Seminary, Easthampton, Mass., and was graduated from Albany Business College, Albany, N. Y., in 1899, having begun his railway career in 1892 as a station clerk for the Delaware & Hudson at Bainbridge during a school vacation. Upon leaving school, Mr. Roberts entered the employ of the Census Bureau at Washington, where he remained until 1902, when he returned to Bainbridge and worked as a station helper for the Delaware & Hudson until 1904, when he became a special agent on the staff of the superintendent of the Susquehanna

division. Later he served as chief clerk in the yard office at Oneonta, N. Y. In 1907 he went to Albany as a clerk in the office of the superintendent of transportation. In 1908 he was made chief clerk in the same office. He resigned this position in 1912 to become division superintendent of the Quebec, Montreal & Southern at Sorel, Que. He remained in that position until April, 1914, when he came to Greenwich, N. Y., as general superintendent of the Greenwich & Johnsonville. In July of the same year he was appointed superintendent of car service of the Delaware & Hudson at Albany, which position he held until his recent promotion.

Traffic

E. Emery has been appointed district passenger agent of the Union Pacific, with headquarters at Pittsburgh, Pa., effective October 16.

W. T. Price has been appointed general agent, freight department, of the Union Pacific, with headquarters at Kansas City, Mo., effective November 1.

G. R. Wright has been appointed commercial agent of the Central of Georgia, with headquarters at Birmingham, Ala., succeeding **E. B. Lewis**, resigned, effective November 1.

Edward Entelman, whose appointment as superintendent of telegraph on the Southern Pacific, with headquarters at San Francisco, Cal., was announced in the *Railway Age* of October 15 (page 679), was born in San Francisco on July 7, 1877, and entered railway service in September, 1895, with the Southern Pacific, as an agent and operator. In January, 1902, he became an operator and dispatcher on the same road and served in this position until April 15, 1906, when he was appointed chief night dispatcher with headquarters at San Francisco, a position which he held until June, 1917, when he was promoted to trainmaster of the Los Angeles division. At the time of his recent appointment Mr. Entelman was assistant superintendent of the Western division, with headquarters at Oakland Pier, a position to which he had been promoted in December, 1918.



Edward Entelman

P. R. Harris, chief clerk in the local office of the Chicago Great Western at St. Joseph, Mo., has been promoted to commercial agent, with headquarters at Des Moines, Iowa, effective November 1.

E. R. Oliver, general freight agent of the Southern, with headquarters at Cincinnati, O., has been appointed freight traffic manager, Lines West, with the same headquarters, effective November 1, succeeding **G. P. Biles**, deceased.

H. M. Morgan, general agent, passenger department of the Grand Trunk, with headquarters at Buffalo, N. Y., has had his jurisdiction extended to include a similar office of the Canadian National, with the same headquarters, effective October 20.

Thomas G. Montgomery, whose promotion to assistant freight traffic manager of the Northern Pacific, with headquarters at St. Paul, Minn., was announced in the *Railway Age* of October 1 (page 593), was born at Aylmer, Ont., and was educated at Upper Canada College, Toronto. He entered railroad service in May, 1900, as a traveling freight agent on the Wisconsin Central, with headquarters at Chicago. During the next twelve years, Mr. Montgomery served continuously

with the Wisconsin Central, and with its successor, the Minneapolis, St. Paul & Sault Ste. Marie, as New England agent at Boston, Mass., and as general agent at Milwaukee, Wis., Pittsburgh, Pa., and Chicago. In March, 1912, he was appointed general agent of the Chicago, Milwaukee & St. Paul, with headquarters at Pittsburgh, Pa., where he served until April, 1915, when he was promoted to assistant general freight agent, with headquarters at Minneapolis, Minn. In December, 1916, he was appointed general agent, with headquarters at New York. When off-line offices were closed in June, 1918, Mr. Montgomery entered commercial work, where he remained until February, 1920, when he was appointed general eastern agent of the Northern Pacific, with headquarters at New York, the position which he held at the time of his recent promotion.

F. D. Hammer, whose appointment as assistant general passenger agent of the Wabash, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of October 22 (page 728), was born at Hubbard, Iowa, on August 8, 1878, and entered railway service in June, 1894, in the freight department of the Chicago, Burlington & Quincy. After being employed for three years in various departments of the Burlington, he was appointed ticket agent on the Chicago Great Western and served on this road until 1901, when he returned to the Burlington as a clerk in the general offices at Chicago. In 1904 he was employed by the Des Moines Union Railway but left that road in July, 1907, to enter the service of the Wabash, as a passenger agent, with headquarters at Kansas City, Mo. During the next eight years he served successively as city passenger agent and as traveling passenger agent. In 1915 Mr. Hammer was appointed district passenger agent, with headquarters at Houston, Tex., and was promoted to division passenger agent at St. Louis in February, 1916, the position he held at the time of his recent appointment.

D. M. Crawford, general agent of the Canadian National, with headquarters at Cleveland, Ohio, has been transferred to Pittsburgh, Pa., succeeding **F. G. Wood**, who has been appointed Ontario freight agent of the Canadian Government Merchant Marine. **F. A. Shaw**, general agent, with headquarters at Detroit, Mich., succeeds Mr. Crawford.

F. L. McNally, traveling passenger agent on the Wabash, with headquarters at Kansas City, Mo., has been appointed division passenger agent, with headquarters at St. Louis, succeeding F. D. Hammer, whose promotion was announced in the *Railway Age* of October 22 (page 728), effective October 15. **F. C. Baird** succeeds Mr. McNally.

Mechanical

C. E. Bingham has been appointed supervisor of mechanical examinations of the Michigan Central, with headquarters at Detroit, Mich., effective October 1.

C. W. Adams, general foreman of locomotives on the Michigan Central, with headquarters at St. Thomas, Ont., has been promoted to superintendent of shops, with jurisdiction over the locomotive department, and with headquarters at Jackson, Mich., effective October 1, succeeding **W. C. Bell**, who has been transferred to Bay City, Mich.

A. H. Eager, whose appointment as general superintendent of rolling stock on the Canadian National and the Grand Trunk Pacific, with headquarters at Winnipeg, Man., was

announced in the *Railway Age* of October 8 (page 637), was born on July 15, 1868, at Waterloo, Que., and entered railroad service in June, 1885, as a machinist apprentice in the shops of the Southeastern, at Farnham, Que. After a short time he left the service of this road to enter the shops of the Canadian Pacific, at Farnham, and was made a machinist in 1893. After serving as machinist for six years, he was made locomotive shop foreman and served in this capacity until 1901, when he was promoted to locomotive foreman, at Megantic, Que. In 1903, he was transferred to Cranbrook, B. C., where he was employed until May, 1906, when he was promoted to general foreman, with headquarters at Calgary, Alta. From 1907 to 1910, Mr. Eager served successively as district master mechanic, with headquarters at Kenora, Ont., and as locomotive foreman at Calgary, Alta. In 1910, he entered the service of the Canadian National, as superintendent of shops, with headquarters at Winnipeg, Man., a position which he held until August, 1916, when he was promoted to assistant superintendent of rolling stock of the Western lines of the Canadian National. At the time of his recent appointment, Mr. Eager was mechanical superintendent on the Canadian National, with headquarters at Winnipeg, a position to which he had been promoted in December, 1918.

Engineering, Maintenance of Way and Signaling

H. S. Jones, valuation engineer of the Gulf, Mobile & Northern, with headquarters at Mobile, Ala., has been appointed chief engineer, with the same headquarters, succeeding **L. W. Duffee**, who has been appointed assistant chief engineer, effective October 15.

Obituary

J. D. Andrews, assistant chief surgeon of the Chicago & North Western, with headquarters at Chicago, died suddenly at his home on November 6.

Charles C. Higgins, superintendent of motive power of the St. Louis-San Francisco, whose death was announced in the *Railway Age* of November 5 (page 820), was born at Aurora, Ill. He graduated from the mechanical engineering department of the University of Minnesota in 1900, and immediately entered railroad work as a special apprentice in the service of the Chicago, Burlington & Quincy. After five years with that road, during which he served successively as assistant in the laboratory, roundhouse foreman and general roundhouse foreman at various points on the line, he left to become associated with the American Brake Shoe & Foundry Co., in its Chicago office. During

the next four years he served as sales engineer and salesman with this company. In 1909, however, he returned to railroad service, accepting an appointment with the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kas., where he was assigned to special work in connection with the motor schedules of the mechanical department. In 1912 he was engaged by J. W. Kendrick, consulting railway engineer, Chicago, to make reports on various railroads in connection with the valuation and rehabilitation of their properties. When the position of assistant to the vice-president of the St. Louis-San Francisco was created on March 15, 1918, Mr. Higgins was appointed to that position. He was made superintendent of motive power on March 1, 1920, the position he held at the time of his death.



F. D. Hammer



C. C. Higgins